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INDIAN NOTES
AND MONOGRAPHS

EDITED BY F. W. HODGE

VOL. III



No. 3

A SERIES OF PUBLICA-
TIONS RELATING TO THE
AMERICAN ABORIGINES

HAWIKUH BONEWORK

BY

F. W. HODGE

NEW YORK

MUSEUM OF THE AMERICAN INDIAN
HEYE FOUNDATION
1920



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THIS series of INDIAN NOTES AND MONOGRAPHS is devoted primarily to the publication of the results of studies by members of the staff of the Museum of the American Indian, Heye Foundation, and is uniform with HISPANIC NOTES AND MONOGRAPHS, published by the Hispanic Society of America, with which organization this Museum is in cordial coöperation.

HAWIKUH BONEWORK

BY

F. W. HODGE

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FOREWORD




THE accompanying paper presents the result of observations on a class of artifacts found in abundance at the ruins of Hawikuh, New Mexico, during the field seasons of 1917 to 1919, inclusive, and although the excavations at that site are not yet finished, it is scarcely probable that many new forms of bone objects will be found. The Hawikuh researches were made possible through the generous coöperation of Harmon W. Hendricks, Esq., a trustee of this Museum, whose great interest in its activities has already resulted in the enrichment of its collections to a remarkable degree, and will be the means of advancing knowledge of American archeology and ethnology to an extent that is now difficult to estimate.

GEORGE G. HEYE,
Director.

HAWIKUH BONEWORK

By F. W. HODGE

INTRODUCTION

O NUMEROUS were mammals and birds in western-central New Mexico when the Spaniards first explored the region toward the middle of the sixteenth century, that it is not strange that in the ruins of the pueblo of Hawikuh excavation should reveal many objects of bone and kindred materials. Castañeda, a member of Coronado's expedition to Zuñi in 1540, and its chief chronicler, speaks of "large numbers of bears in this province, and lions, wildcats, deer, and otter," while other members of the army mention clothing made from the skins of deer, and of the domestication of turkeys by the Zuñi, although it was said by Coronado himself, writing in August, that "there are not many birds, probably because of the cold, and because there are

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	<p>no mountains near.”¹ However, the specimens themselves give the most direct evidence of the mammals and birds whose bones entered into the economic life of the early Zuñi people, for, represented in their artifacts are bones of the bison, prong-horn antelope, western mule deer, western Virginia deer, grizzly bear, wildcat, puma, coyote, hare, brush rabbit, and turkey, besides the domestic goat (introduced, of course, by the Spaniards), and the mud turtle, not to mention the employment of human bones as artifacts. It is a pleasure in this connection to acknowledge the indebtedness of the Museum to Mr H. E. Anthony and Mr Herbert Lang, of the American Museum of Natural History, for the determination of the bones, frequent reference to which, made possible by the valued aid of these gentlemen, will be made in this paper.</p> <p>No objects designed for utility could be made more readily from any substance available to the Zuñi people than from bone and antler, since these materials were already partly shaped for use, especially as</p>
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<p>the commoner implements and as beads, only a few moments being required to modify most of them into the desired implements and ornaments. For an awl, a bird or a mammal bone usually necessitated only pointing by rubbing one end on sandstone, when the tool was ready for use; for beads, a hollow bone was cut the desired length and the ends rubbed smooth: hence the process employed in fashioning the commonplace tools and ornaments was as simple as the objects themselves.</p> <p>That bone implements were not highly treasured by the inhabitants of Hawikuh, and that they were made with little expenditure of labor, is exemplified by the fact that, although some were found deposited with the dead and others were recovered from the houses, by far the greater number of the thousands unearthed were from the refuse heaps beyond the dwellings, where they had been cast with the village débris. Broken and discarded implements and ornaments are of course to be expected in such refuse, but the finding therein of the numerous perfect tools and other artifacts of bone,</p>	
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many of them highly finished, is not so readily accounted for.

BONE AND ANTLER CUTTING

For cutting small bones the surface was usually marked by slight scoring around the

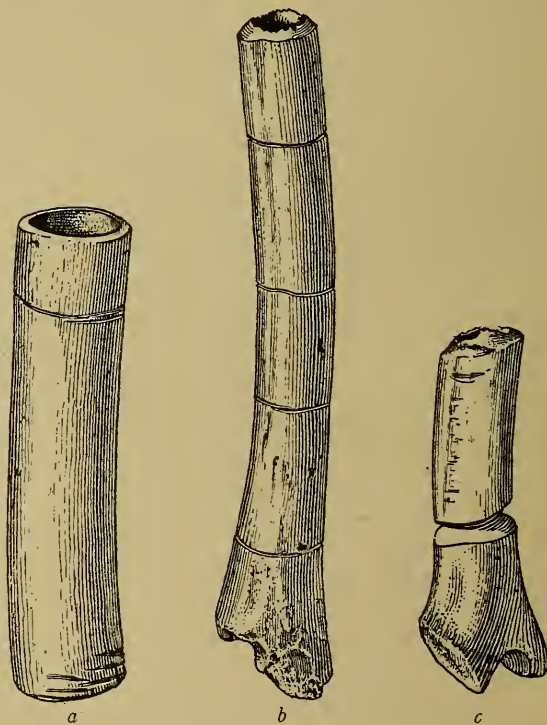
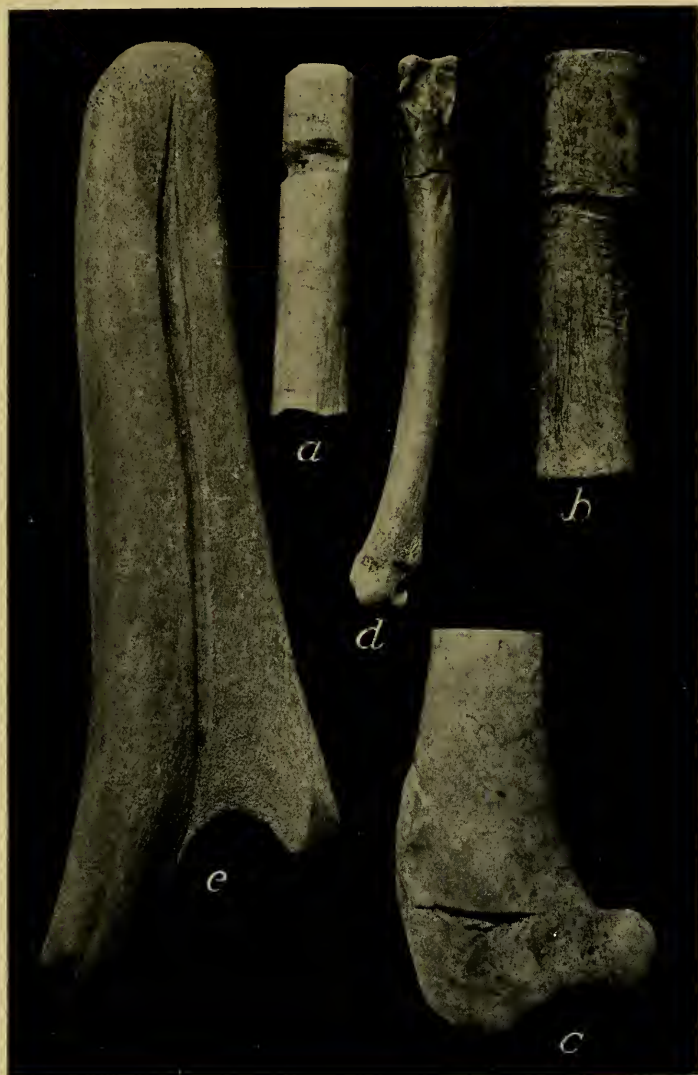


FIG. 1.—Primary processes in boneworking.



PRIMARY PROCESSES IN ANTLER AND BONE WORKING
(Slightly reduced)

circumference (fig. 1, *a*, *b*), then sawed with an edged stone (figs. 1, *a*, and 2, *a*), or by means of a flake of sandstone with a blunt edge

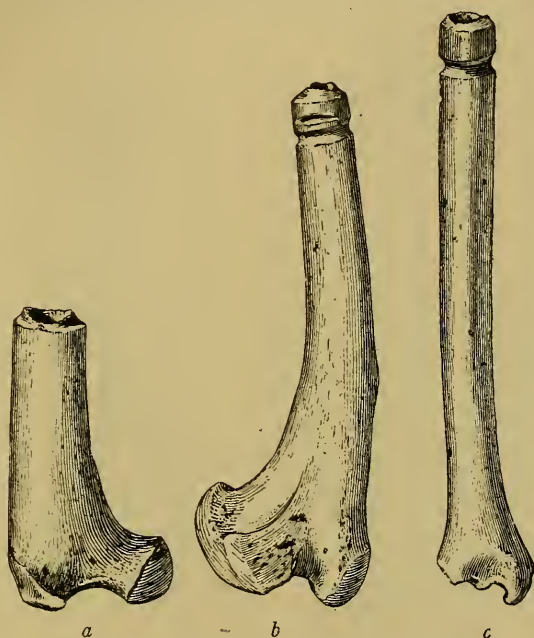


FIG. 2.—Primary processes in boneworking.

(pl. I, *a*, *b*; fig. 2, *b*, *c*), sufficiently deep to enable breaking with the fingers. The implement or bead was then ready for finishing by rubbing the ends smooth. Sometimes, in

bead-making, the cut end of the remaining, usually the articular, portion of the bone was rubbed smooth before further cutting

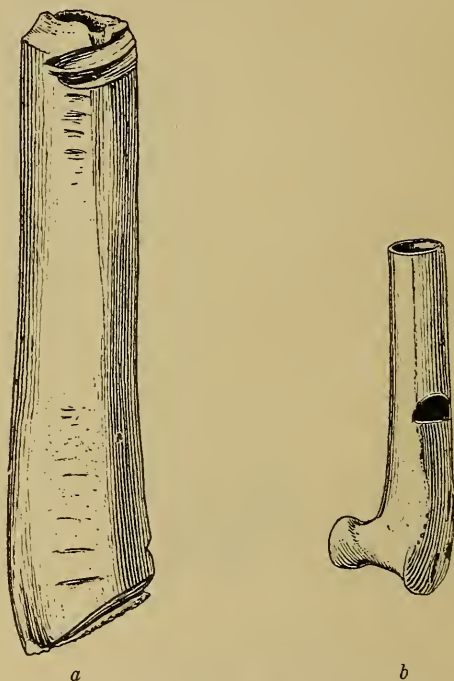


FIG. 3.—Primary processes in boneworking.

was undertaken (pl. I, *c*; fig. 3, *b*), no doubt as a matter of convenience. We will refer

to modifications in this process in treating of the bone beads recovered from Hawikuh. In some cases the cutting and severing of bones was neatly done, but many examples

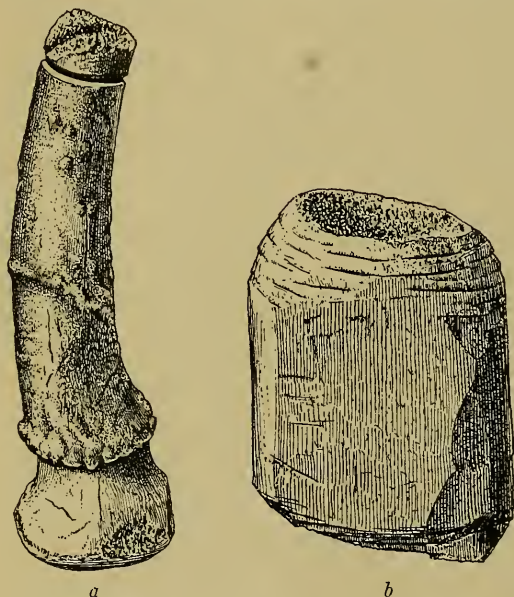


FIG. 4.—Primary processes in antler severing.

exhibit clumsy workmanship, the scoring being uneven or several attempts being necessary before the bone was ready for breaking in two. Evidences of this are

shown in figs. 2, *b*, and 3, *a*. Pl. I, *d*, exhibits the metacarpal of a coyote that had been scored, doubtless for cutting into

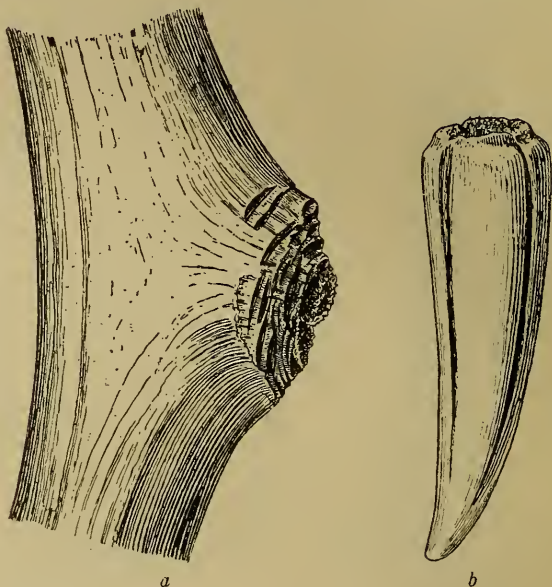
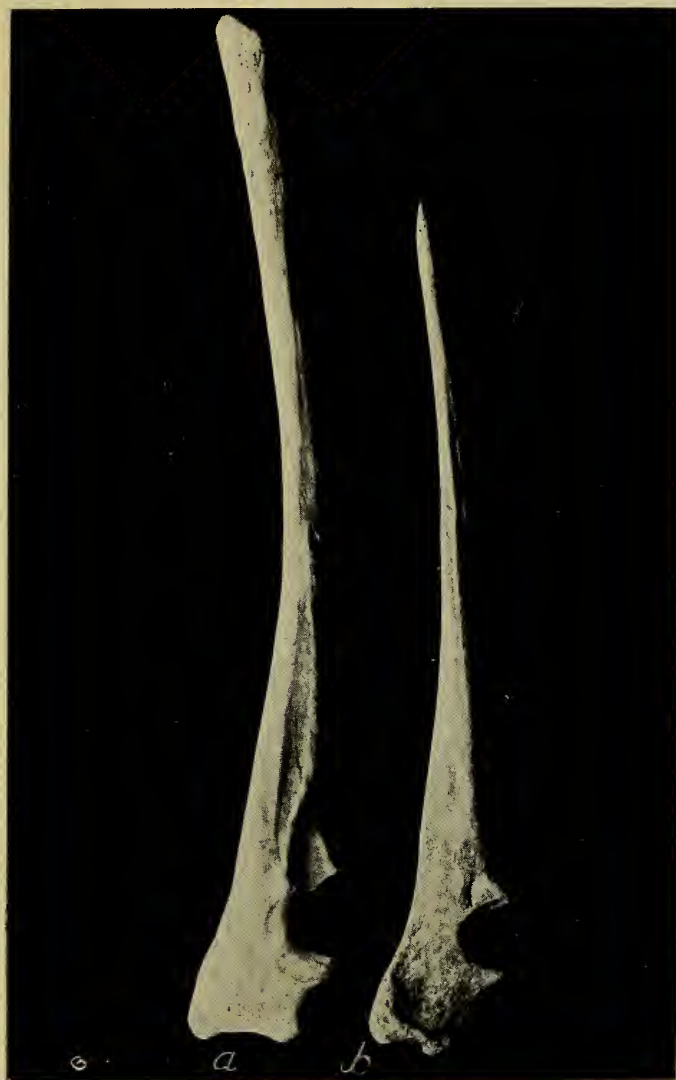


FIG. 5.—Processes of antler severing: *a*, by hacking; *b*, by scoring and by hacking and breaking.

small beads, but the work proceeded no further.

For severing antler the same processes were generally in vogue (pl. III, *a*; fig. 4),



AN UNWORKED ULNA OF A COYOTE AND A FINISHED AWL
(Length of *b*, $6\frac{1}{4}$ inches)

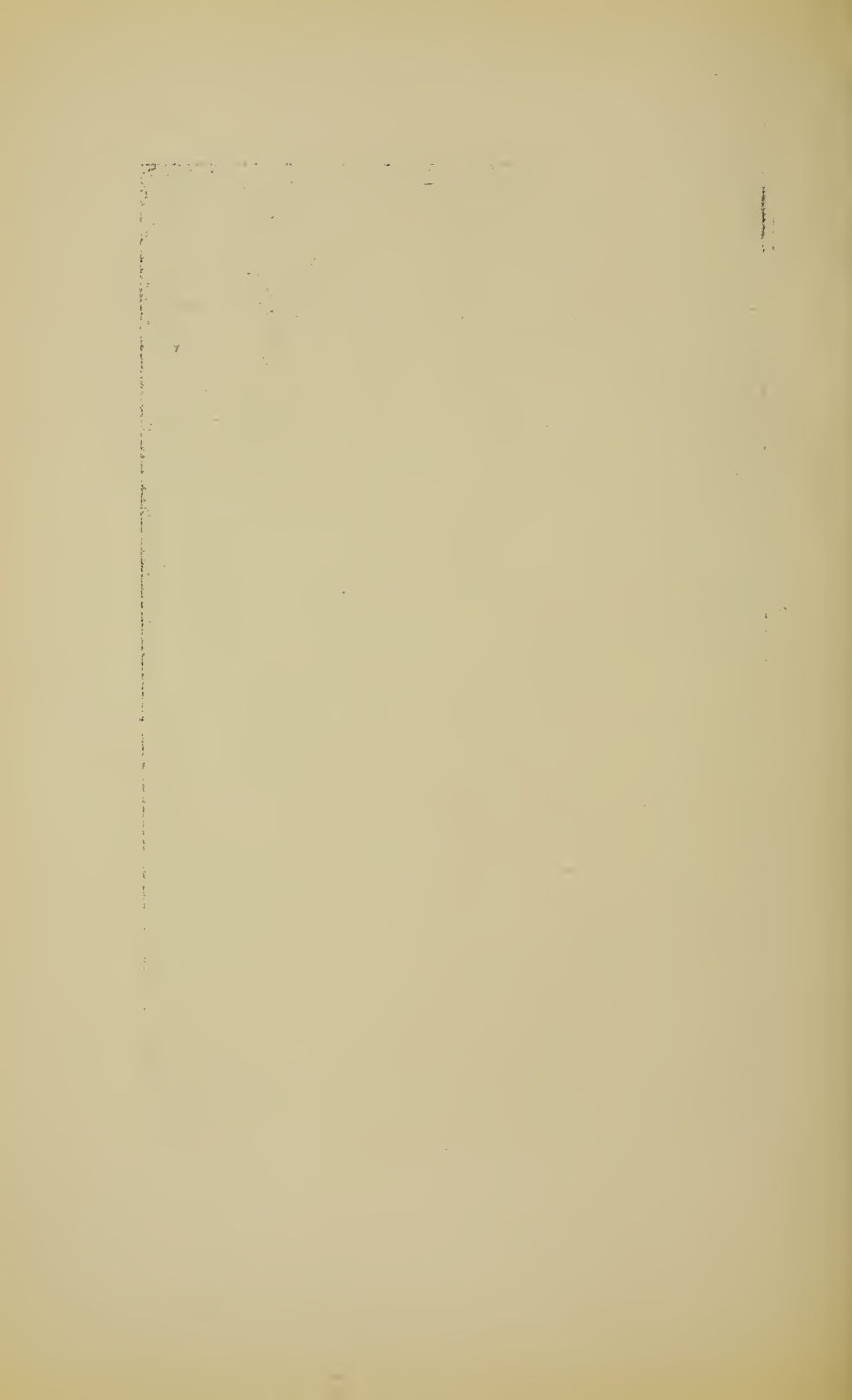


FIG. 6.—Antler severed by scoring.

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	<p>although, being heavier than utilizable bone, hacking with a stone was sometimes employed (pl. III, <i>g</i>; fig. 5, <i>a</i>). Longitudinal cutting of bone was usually unnecessary, as bones of all shapes and sizes were ever available; yet numerous examples of such splitting are among the Hawikuh collections and will be referred to in connection with the description of the finished implements of this class. Antler likewise was frequently worked in this way by scoring the object deeply (pl. I, <i>e</i>; fig. 5, <i>b</i>), and then breaking (fig. 6).</p> <p>An example of longitudinal bone-cutting is shown in pl. III, <i>c</i>, which exhibits part of a metatarsus of a deer, but the edges have been so chipped and worn that little of the striation made by the cutting tool remains. The purpose for which this bone was used is not known, as the distal end is broken off. What is probably the part of a leg-bone is illustrated in pl. XX, <i>c</i>; it has been shaped by chipping, and battered as if used for hammering, but one end has a chisel-like edge, smoothed by wear and then fractured, when the crude tool evidently was discarded.</p>
III	INDIAN NOTES



VARIOUS BONE AND ANTLER OBJECTS
(Length of *f*, $9\frac{7}{8}$ inches)



AWLS

Of all the artifacts of bone found at Hawi-
kuh, awls and awl-like implements, includ-
ing weaving tools, are the most numerous,
many hundreds having been recovered from
the refuse and from graves and
houses. They are fashioned
from bones of various small
mammals and of birds, espe-
cially the turkey. In size the
awls vary from 9 in. (see the
longest one shown in pl. x) to
 $1\frac{1}{2}$ in. in length (fig. 7). Al-
though generally termed awls
by archeologists, these useful
implements no doubt were em-
ployed for many purposes, as
their points vary considerably,
some being almost as sharp as
a needle, while others are so blunt that for
the sake of distinguishing them we will
here designate them as punches. The
chisel- and gouge-like tools will be con-
sidered as in a class by themselves.



FIG. 7.—A
tiny awl.
(Actual size.)

In many cases the entire awl was worked

from a piece of bone nicely rounded and pointed with more or less labor, while in



FIG. 8.—Awls showing slight modification of the original forms. (Actual size.)

most instances the articular end of a deer-bone was left intact and used as a handle,



AWLS OF VARIOUS KINDS
(Length of *i*, $8\frac{1}{4}$ inches)

and a very convenient one it made, since it fitted the middle finger without modification at that end. Awls of this class, indeed, required little alteration of the natural

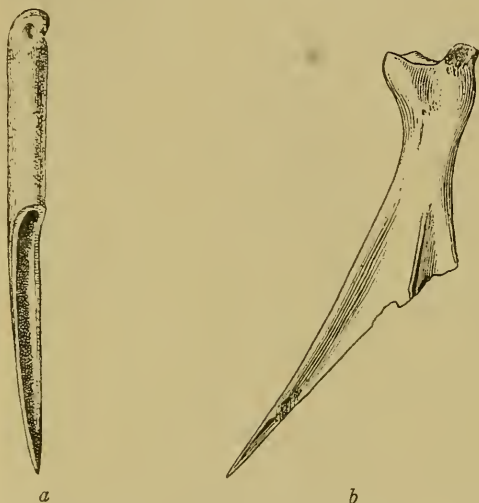


FIG. 9.—Awls showing slight modification of the original forms. (Length of *a*, $1\frac{7}{8}$ in.; of *b*, $2\frac{1}{4}$ in.)

forms, as will be seen by the specimens shown in pl. II, which exhibit (*a*) an unworked ulna of a coyote, and (*b*) a finished awl. Other awls showing slight modification are illustrated in pl. IV, *a-i*, *k-s*; pl. V,

a-c, and figs. 7, 8, 9, *b*. It should be said, however, that some of the larger awls were in such long or constant use and were so frequently resharpened that little of the origi-

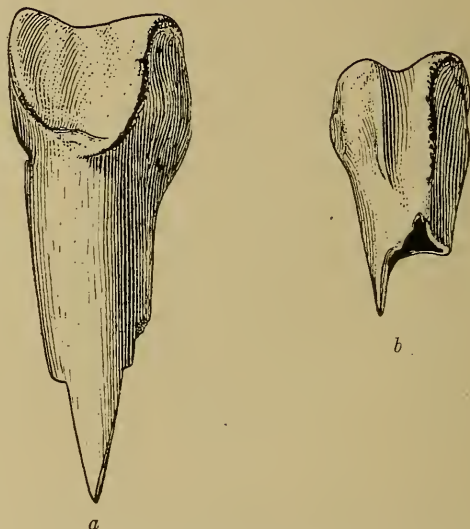
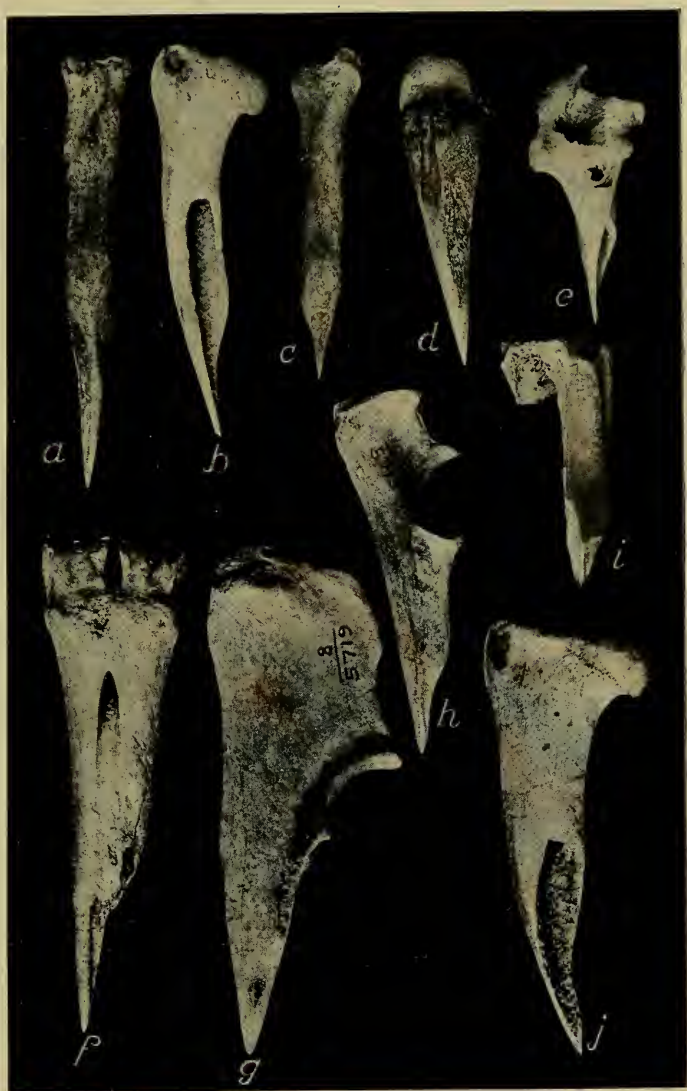


FIG. 10.—Awls greatly worn and constantly resharpened.
(Actual size.)

nal shaft remains (pl. v, *d-h*; fig. 10), while sometimes a broken tool or a broken unworked bone was refashioned or newly worked, as the case might be, with like re-



BONES ADAPTED FOR USE AS AWLS BY SLIGHT
MODIFICATION
(Length of *f*, 4 inches)

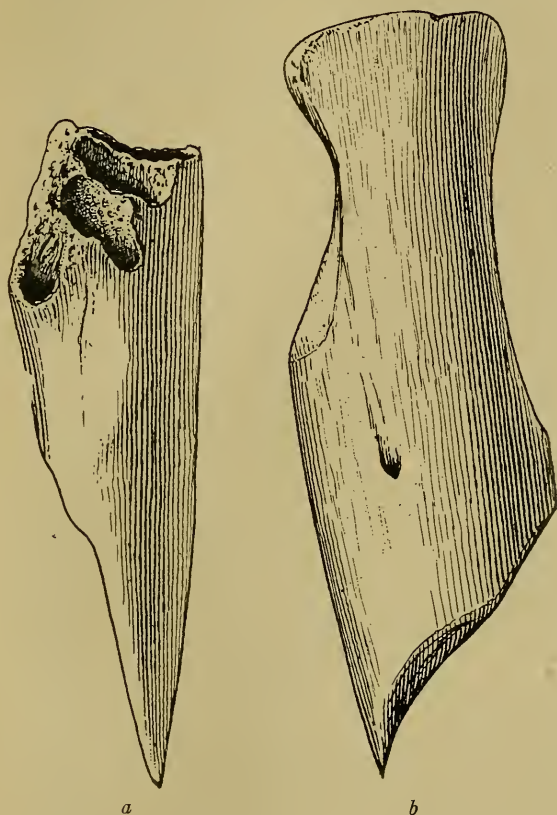


FIG. 11.—Unusual awls. (*a* is made from part of the mandible of a mule deer. Length of *a*, $2\frac{1}{8}$ in.; of *b*, $2\frac{1}{2}$ in.)

sult (pl. III, *d*; pl. v, *j*). In this connection pl. III, *e*, is presented for comparison with pl. v, *d*. It will be observed that fig. 11, *a*, illustrates a very commonplace awl made from part of the mandible of a mule deer.

The examples shown represent only a small selection from hundreds of specimens. It is obviously impracticable to illustrate the many variations in dimension, which, of course, depended on the size and character of the bones used and the particular purposes for which the implements were designed.

Another form of awls is that consisting of fortuitous splinters of bone, or of purposely split bones, worked to a point like the others. Some of the awls of this class suggest that their makers realized, through practical use, the strength of an implement having a concavo-convex shaft, notwithstanding its comparative thinness; but whether or not this was the case, there is no doubt that many bones were intentionally split lengthwise in order to afford a finer point than could have been produced had the thick bone been left intact, without



AWLS-FORMED CHIEFLY FROM BONE SPLINTERS
(Length of *b*, $4\frac{5}{8}$ inches)

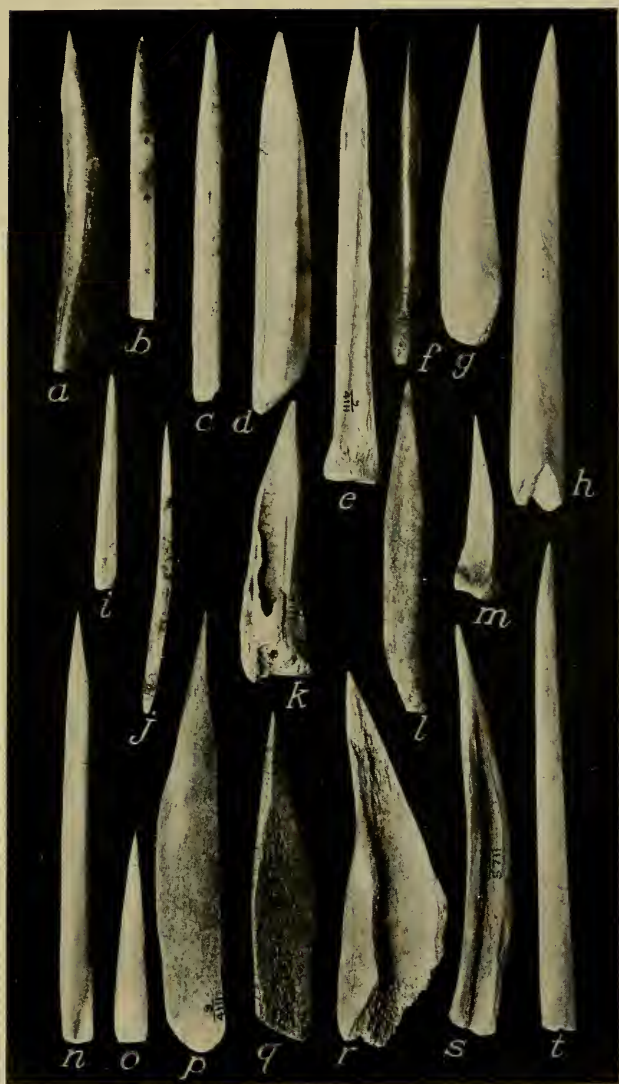
A W L S	85
<p>sacrificing the strength of the shaft. Several varieties of awls made from random splinters are shown in pl. VI, <i>a-g, i-t</i>, and fig. 11, <i>b</i>, in none of which does the bone exhibit severing after scoring. Awls showing intentional grooving and splitting are illustrated in pl. VI, <i>h</i>, and pl. VII, while no doubt many others were subjected to the same process, but the marks of the primary work have been effaced either by abrasion in finishing the tool or from wear by continued use. In the illustrations last referred to, several of the specimens (pl. VII, <i>b, d, i, j, m-o, t</i>) have had their cut edges more or less smoothed through one of these causes. The four specimens shown in pl. VIII, <i>b-e</i>, exhibit on their concave faces what seems to have been the beginning of an attempt to cut them in two lengthwise, while <i>a</i> of the same plate shows similar cutting as if to remove a hump in the bone.</p> <p>Examples of awls showing a stage advanced beyond the simple splinter and split implements are illustrated in pl. IX and X. These are all either of split bone or the natural form has been considerably altered</p>	
A N D M O N O G R A P H S	3



FIG. 12.—Nicely finished awl, unusual in that it is squarish. (Length $4\frac{5}{8}$ in.)

by abrading and rubbing, but all the original surface has not been worked away.

Mention has been made of awls that show working of the entire surface. Like the plainer specimens, these are of many sizes and forms, and altogether are the most attractive in appearance of the awl-like implements found at Hawikuh. They vary in length from $8\frac{1}{4}$ in. (pl. IV, *i*) to $1\frac{1}{2}$ in. (pl. XIII, *i*), and most of them are quite symmetrical. A selection of these nicely finished implements is shown in pl. XI-XIII, and fig. 12. It will be observed that some of the specimens pertaining to this class are pointed at both ends. The tiny awl shown in pl. XIII, *i*, only $1\frac{1}{2}$ in. in length, is the point of a weaving implement that had been broken off and made



AWLS MADE FROM BONES SPLIT AFTER GROOVING
(Length of *e*, $5\frac{1}{8}$ inches)

to do further but different service. Probably the shorter awls of this kind were used

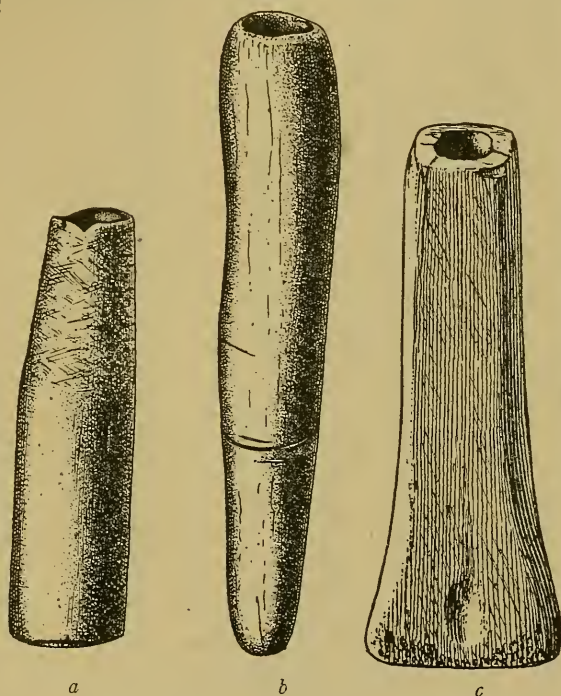


FIG. 13.—Handles for awls. (Actual size.)

with a wooden or a bone handle, like certain points of iron found at Hawikuh. Handles that may have been used for such purpose, as

they exhibit no evidence of having had iron points, are illustrated in figs. 13-15, and others will be referred to and illustrated

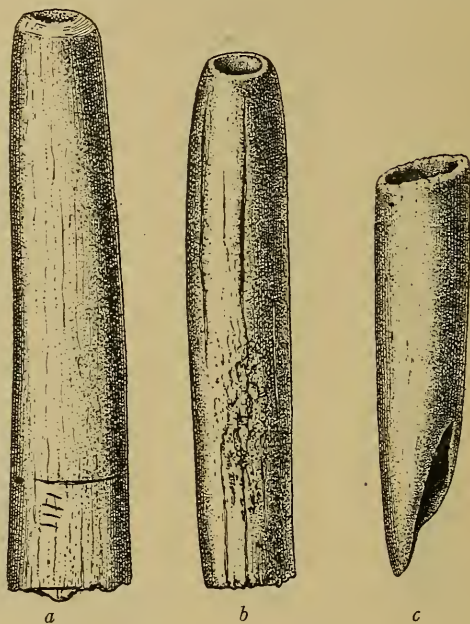
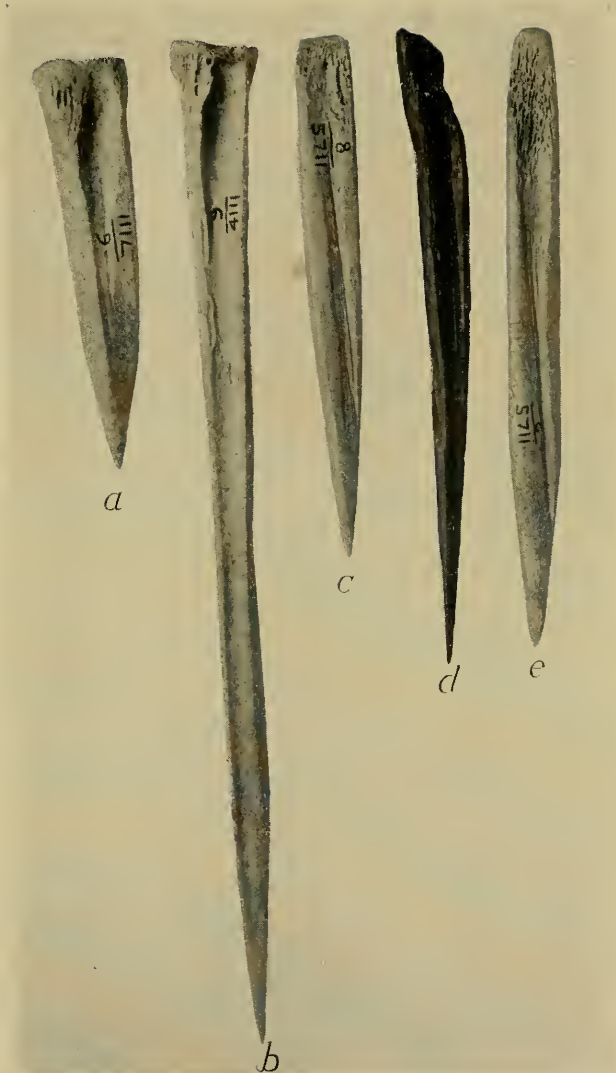


FIG. 14.—Handles for awls. (Actual size.)

later. Possibly certain tubular bones may have been employed similarly. An awl uniquely hafted is shown in fig. 16, the handle consisting of part of a human coccyx



AWLS FORMED FROM BONES SPLIT LENGTHWISE, BUT
OTHERWISE WITH LITTLE MODIFICATION
(Length of *e*, $4\frac{5}{8}$ inches)

through which the slender implement passes and is wedged in place with a splinter of bone.



FIG. 15.—Awl handle.
(Length 3 in.)

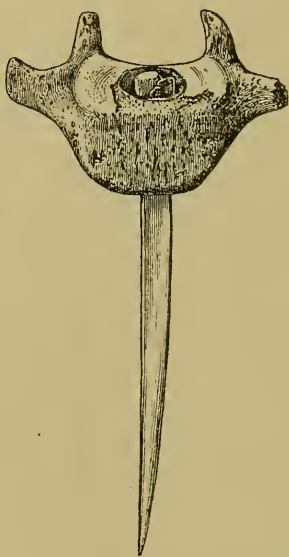
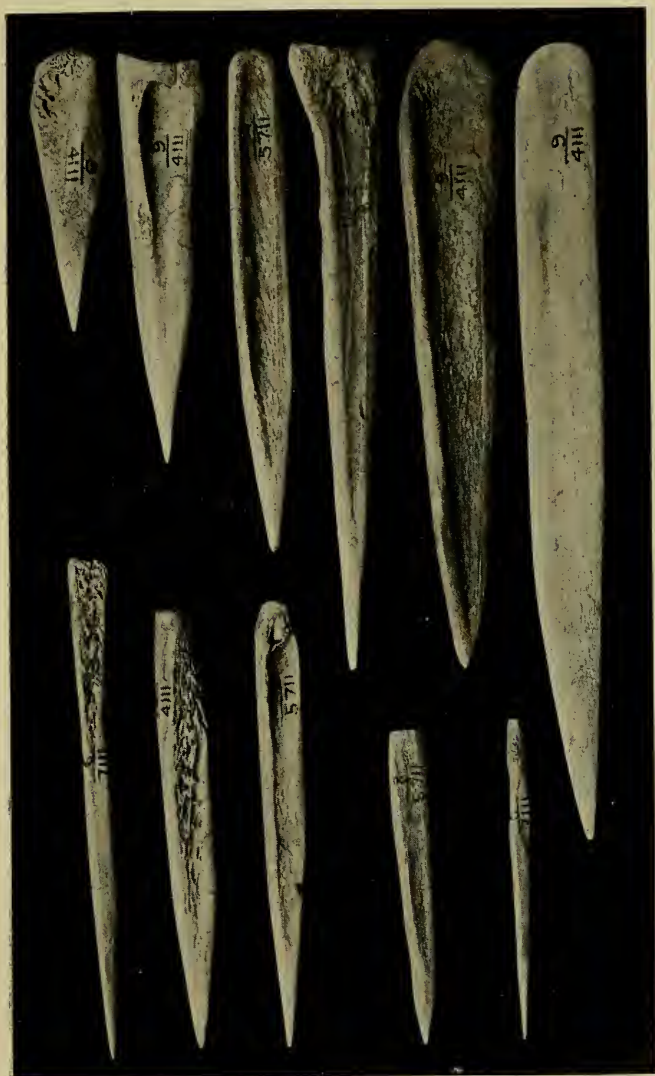


FIG. 16.—Awl with handle
made from a human coccyx.
(Length 3 in.)

The awls of Hawikuh are almost invariably plain, the Zuñi of that pueblo having devoted comparatively little attention to the ornamentation of their implements of



FIG. 17.—Awls with the handle end ornamented by incising (*a*), and by scoring (*b*) probably as a tally. (Length of *a*, 4 in.; of *b*, 3½ in.)



AWLS MADE OF BONES SPLIT LENGTHWISE OR WITH THE
NATURAL FORM PRESERVED, AND WITH MORE OR
LESS SECONDARY WORKING
(Length of the longest awl, 6 inches)

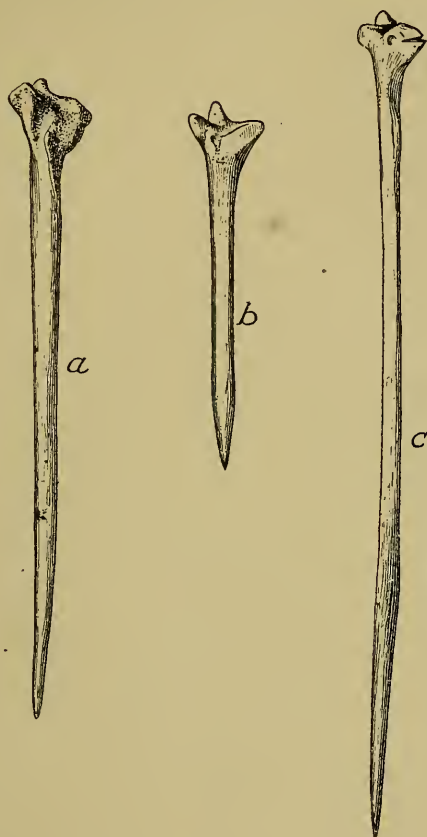


FIG. 18.—Awls made from fibulæ of the wildcat. The handle-end of *b* and *c* has been carved to represent an animal's head, while the corresponding end of *a* is unmodified. (Length of *b*, $2\frac{3}{8}$ in.; of *c*, $5\frac{5}{8}$ in.)

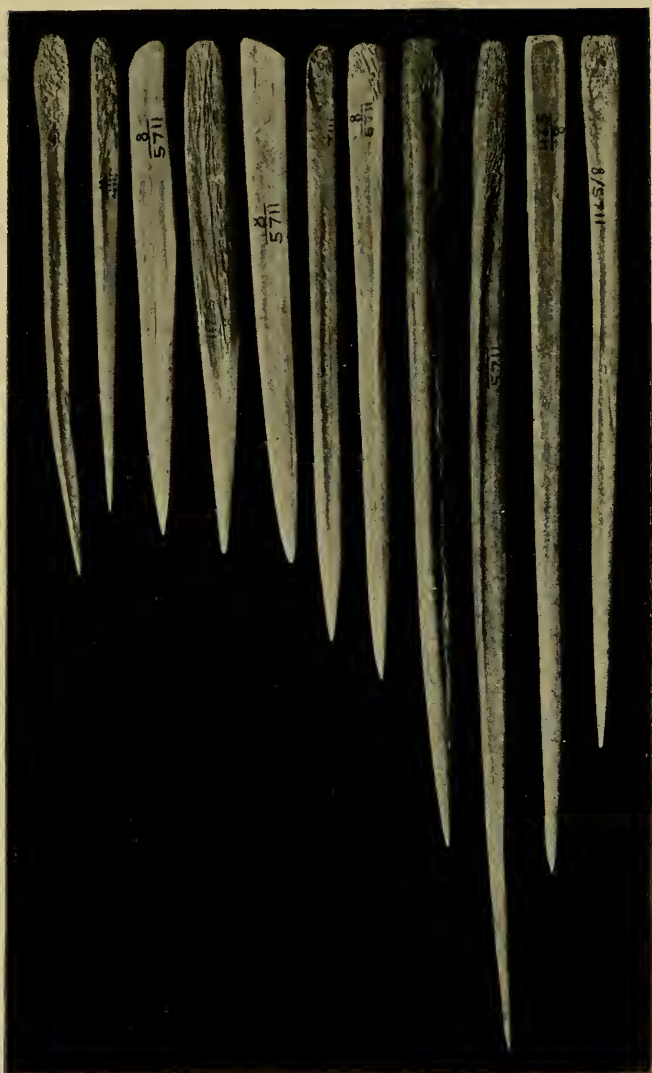


FIG. 19.—Well-finished awl with the handle drilled.

bone and antler. There are a few exceptions, however, as shown in fig. 17, *a*, which illustrates an awl rather rudely decorated with an incised design, the central motive of which may be a dragonfly, while another (fig. 17, *b*) is scratched with nine lines at the edge of the butt end, possibly as a tally rather than for ornament.

An exceptional method of treating small bone awls in the way of ornamentation is illustrated in fig. 18, *b*, *c*, in which the distal portion of the fibula of a wildcat has been modified to represent the head of an animal, but in each case without the eyes. In this illustration *a* represents the corresponding end of an awl that has not been altered.

What probably served as



AWLS MADE OF BONES SPLIT LENGTHWISE OR WITH
THE NATURAL FORM PRESERVED, AND WITH
MORE OR LESS SECONDARY WORKING
(Length of the longest awl, 9 inches)

an awl is the object shown in fig. 19. It is $5\frac{1}{2}$ in. long in its present condition, sharp-pointed, and with a carved end that originally may have afforded means of attachment to a thong; but it is now broken in such a way as to give the end a forked appearance. The dotted lines show what was probably the original shape.

It will be well to refer at this point to two interesting and unusual objects of bone—one (fig. 20) with the butt-end carved in representation of a mountain-sheep, the other (fig. 21) from the distal end of the metatarsus of a pronghorn antelope cut and incised on both sides to portray a



FIG. 20.—Awl with handle carved to represent a mountain-sheep. (Length 4 in.)

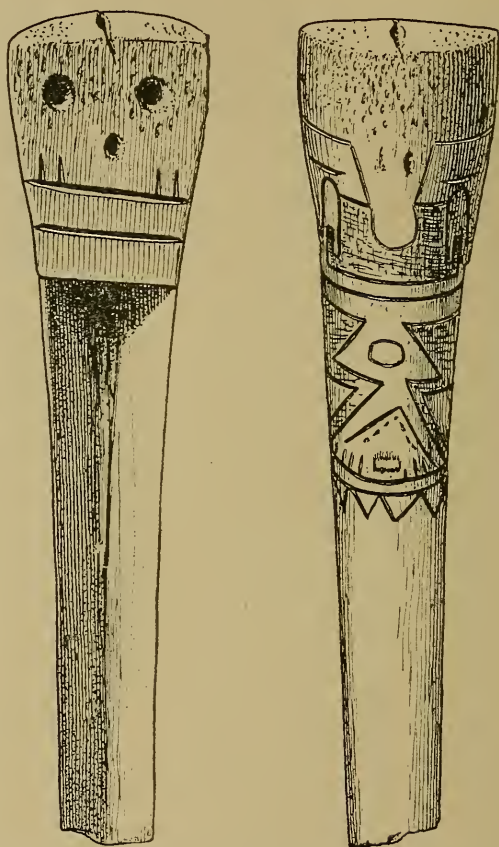


FIG. 21.—Part of an awl carved to represent a Shumai-koli mask. (Length, with point missing, 4 in.)



SMOOTHLY FINISHED AWLS
(Length of *a*, $4\frac{3}{8}$ inches)

A W L S	95
<p>Shumaikoli mask. The latter awl, which is broken at the point, was found in the refuse-heap outside of the pueblo walls, and was immediately recognized as representing a Shumaikoli figure, not only by the Zuñi finder but by several other of the Zuñi workmen as well, one of whom is a member of the Shumaikoli fraternity. This man stated that such an implement was once used for piercing the septum of the nose of the officers of the order, but bone-piercers have evidently long passed out of use at Zuñi, as will appear from the following account of the Shumaikoli initiation given by Mrs Stevenson:</p> <p>“The officers have the septum of the nose pierced, this ceremony occurring in the early morning, when the members at large hasten to lap the blood as it flows from the wound. The piercing is done with a splinter of archaic wood, a bundle of it being in the keeping of the director of the fraternity. The aperture is plugged with a bit of wood so perfectly fitted that it is scarcely perceptible. The plug is removed for ceremonials, and the quill end of an eagle plume is thrust through the opening. Sometimes two plumes are worn on opposite sides. A man having the septum pierced must observe continence for one year. At the ex-</p>	
A N D M O N O G R A P H S	3

piration of this time he captures a wood rat (neotoma), and roasting it, eats it, that his blood may not be made impure by terminating his period of continence.”²

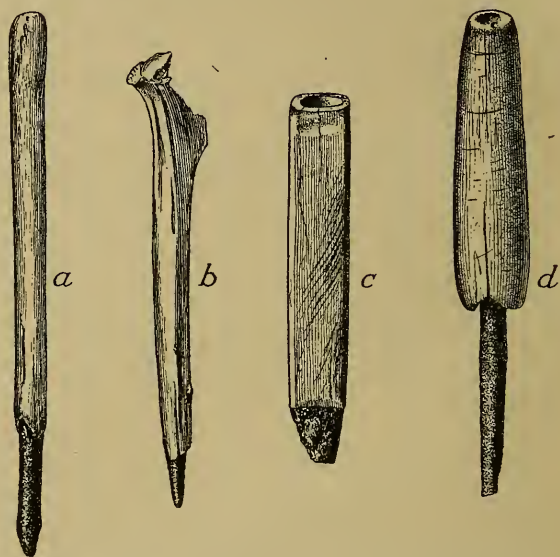
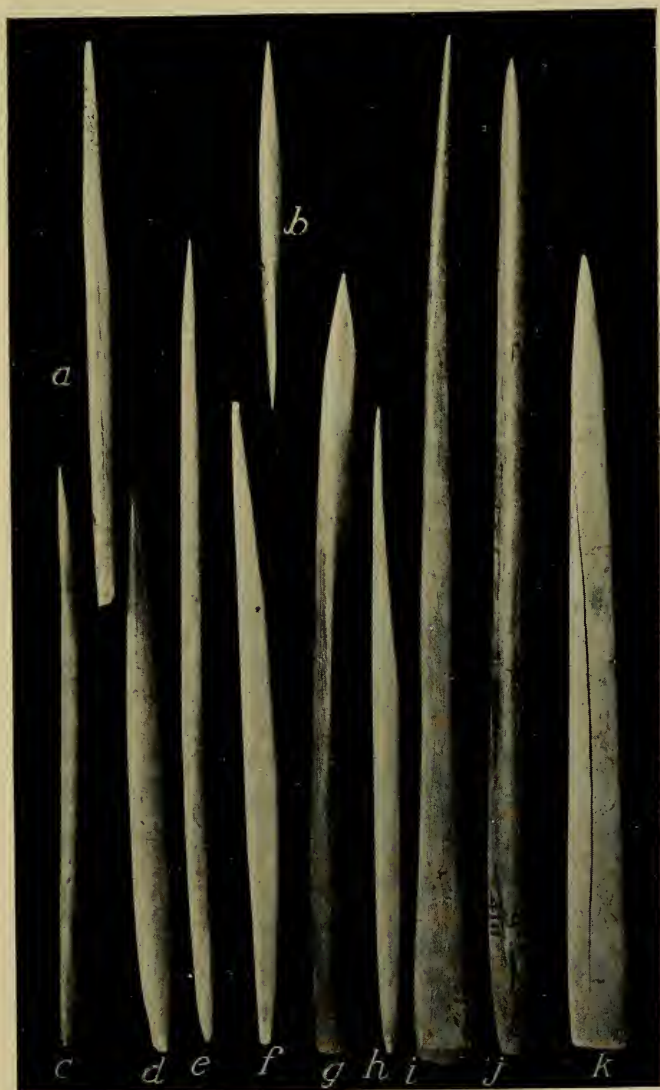
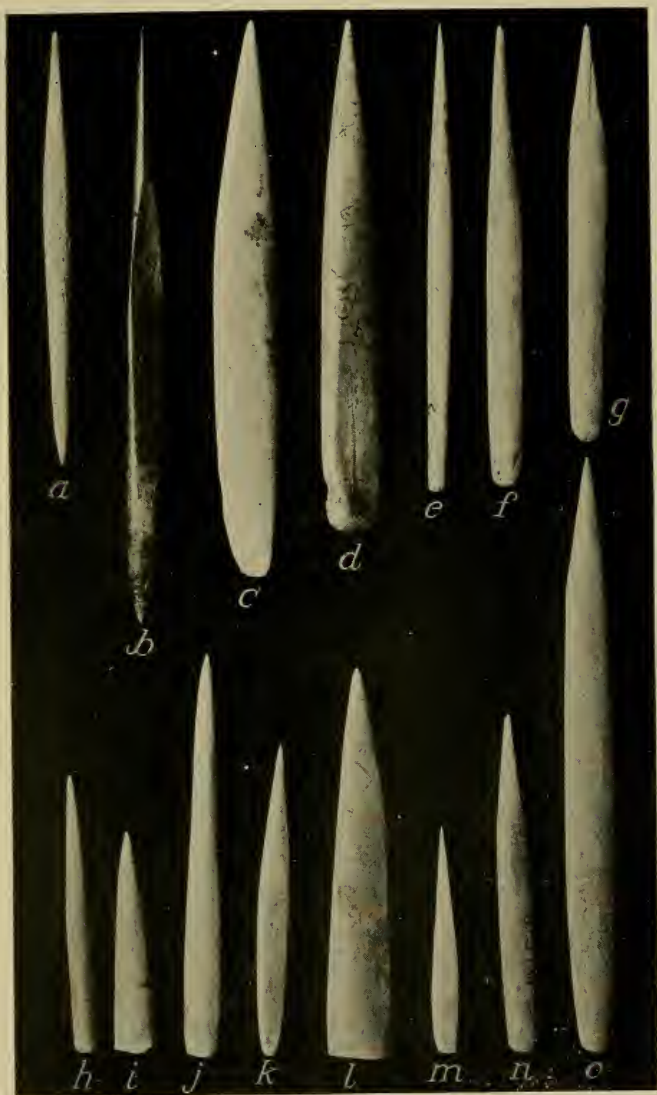


FIG. 22.—Iron awls with bone handles. (Length of *a*, $3\frac{1}{2}$ in.)

That the Shumaikoli fraternity was represented at Hawikuh is indicated by a tradition at Zuñi “that a Hawikuh man impersonating a white (East) Shumaikoli had his mask stick to his face and went



SMOOTHLY FINISHED AWLS
(Length of *j*, $6\frac{1}{8}$ inches)



SMOOTHLY FINISHED AWLS
(Length of *b*, $3\frac{3}{4}$ inches)

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<p>crazy and ran to Zuñi [Halona] because he broke his taboos (<i>teshkwi</i>), i.e., he did not stay indoors, nor did he smoke.”³</p> <p>It may here be mentioned that a number of awls from Hawikuh are completely blackened by fire, while others have blackened points only, as if intentionally charred for the purpose of hardening the bone.</p> <p>We should not close our treatment of bone awls without alluding to several awls of iron inserted in bone or antler handles. These, of course, had their origin after the advent of the Spaniards in New Mexico, and are among the few objects found at Hawikuh that show the influence of European contact on the native arts. Some of the specimens referred to are illustrated in fig. 22.</p> <p>SPATULATE AWLS AND SPATULAS</p> <p>Probably few Indian tools were employed for a single purpose, but served many needs in the daily life of the people. Awls were used for piercing skins for sewing, perhaps more than for anything else, but they were used also in weaving and basketmaking,</p>	
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FIG. 23.—Spatulate implements: *a*, Short spatula; *b*, Spatula thinned at both ends; *c*, Knife-like spatula. (Length of *b*, $5\frac{1}{2}$ in.)

SPATULATE AWLS	99
<p>although blunter implements were more practical for the latter purpose among the Zuñi, whose baskets were not of the finest types. Doubtless there were many other uses to which awls were put, if we may judge by the great range in their size and shape, as sharp-pointed implements were in everyday demand, and until the introduction of iron in quantity by the Spaniards, no better material than bone was available.</p> <p>Oftentimes we find a class of bone tools pointed at one end and squared or rounded but thin at the other—a kind of awl-spatula. The usefulness of such a combination implement is manifest, since the spatulate end might be used in many cases for smoothing or rubbing where a point would not serve. Several awl-spatulas are here illustrated (pl. xiv, xv). It will be observed that the flat end is generally ground or worn obliquely. Pl. xiv, <i>i</i>, shows an attempt at ornamentation with an incised geometrical pattern.</p> <p>In much smaller proportion than the awl-spatulas is a related class of implements, spatulate at one end but not pointed at</p>	
AND MONOGRAPHS	3

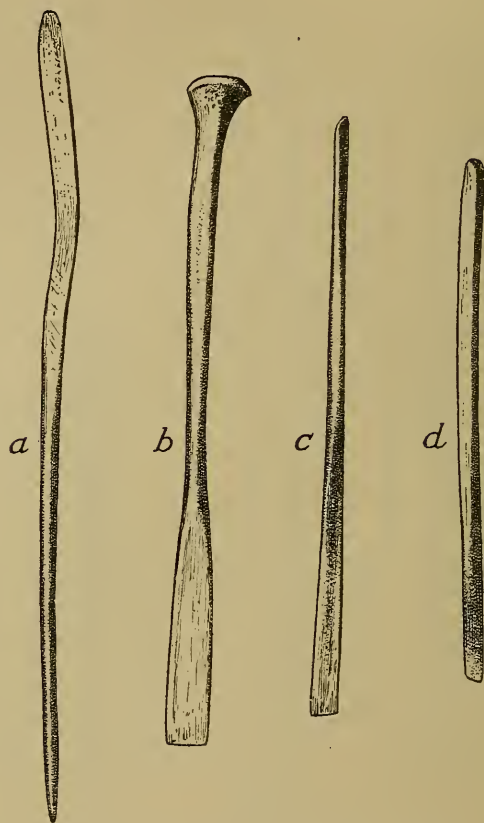
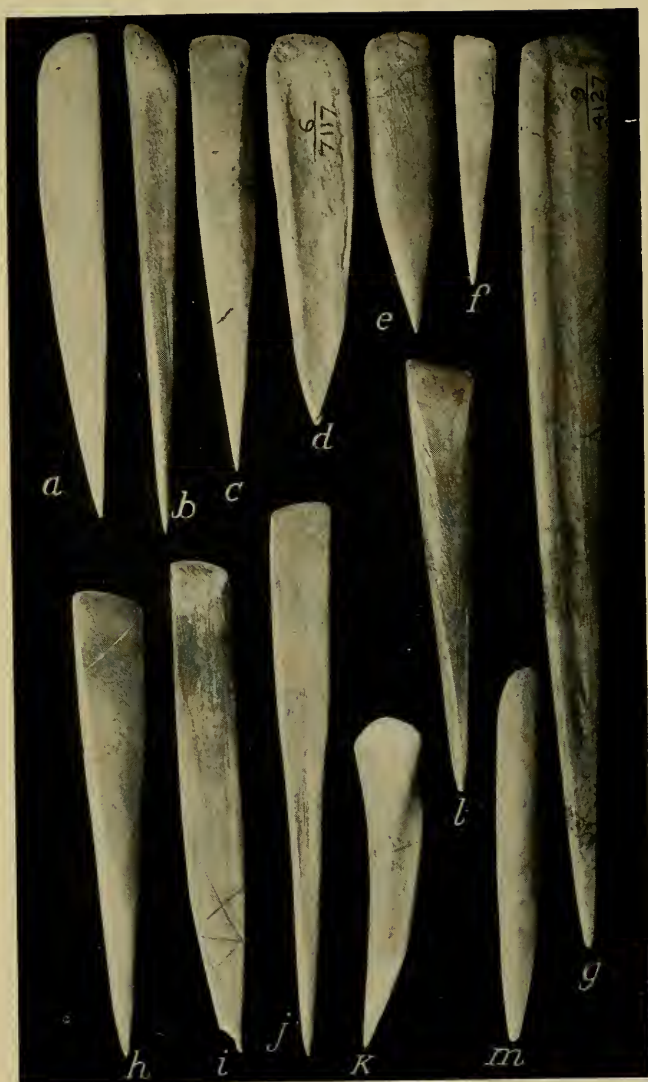


FIG. 24.—Slender spatulate implements. (Length of *a*, $5\frac{1}{8}$ in.)



AWL-SPATULAS
(Length of *g*, $7\frac{1}{8}$ inches)

the other, such as is shown in fig. 23, *a*, which seems too short for use as a chisel.

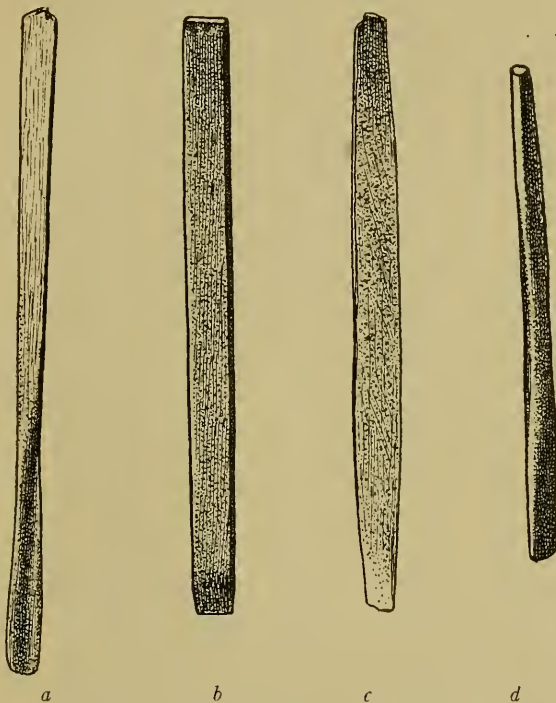
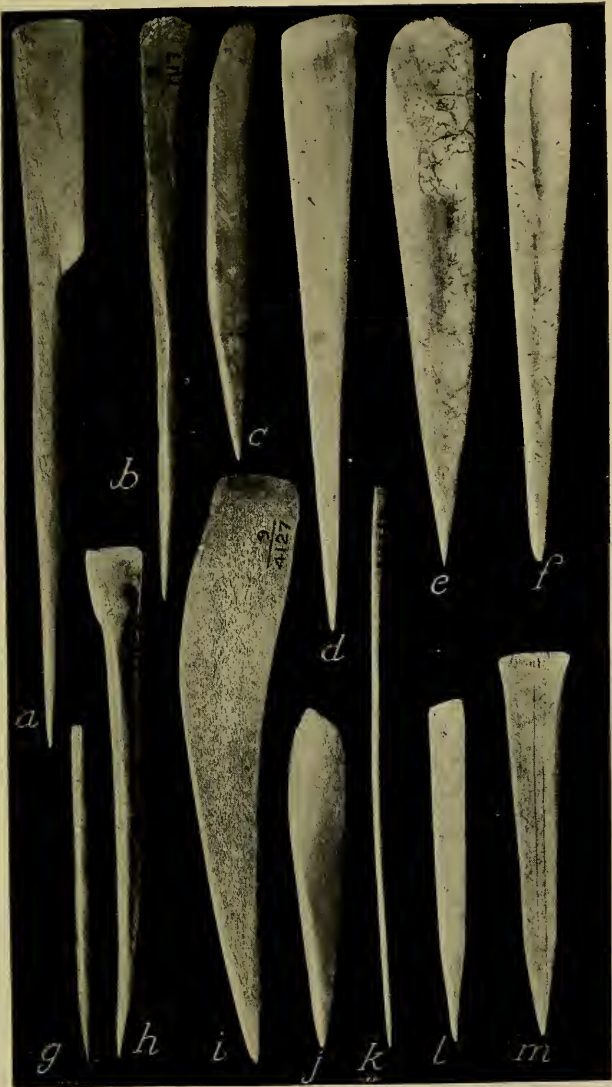


FIG. 25.—Slender spatulate implements. (Length of *a*, 3 in.)

Another example is thinned at both ends (fig. 23, *b*), while still another (fig. 23, *c*),

102	HAWIKUH BONEWORK
	<p>unique in the collection, is beveled to an edge along its lower angle, as if for use as a knife.</p> <p>· Almost in a class alone, by reason of their small size and delicacy, are several spatulas and awl-spatulas such as are illustrated in figs. 24 and 25. Of these, fig. 24, <i>d</i>, is hardly distinguishable from some forms of punches, while <i>a</i> is fashioned to a sharp point at one end.</p> <p style="text-align: center;">WEAVING TOOLS</p> <p>The statement that various forms of bone implements are sometimes difficult to classify, since they grade almost imperceptibly one into another, is especially applicable in the case of the ordinary awls and the weaving tools, which are so thoroughly identical that they may be distinguished only by the worn grooves on the latter, caused by pressing down the weft of fabrics in process of manufacture; indeed there is no reason to suppose that they were not used as much in sewing as in weaving. These weaving bones were almost as numerous as the awls at Hawikuh. A few are</p>
III	INDIAN NOTES



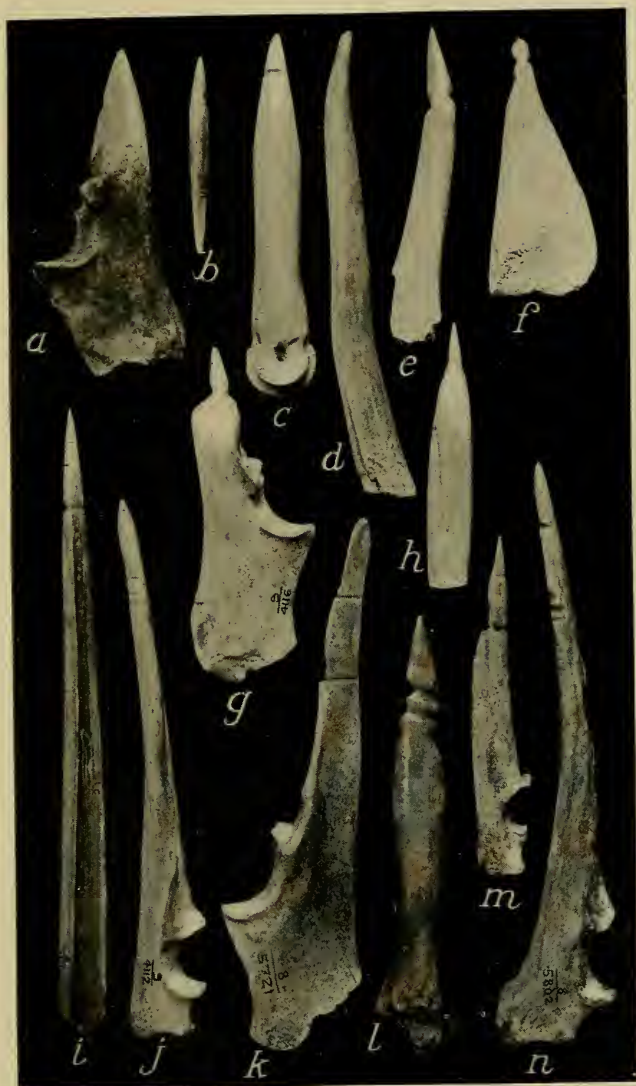
AWL-SPATULAS
(Length of *a*, 6 $\frac{3}{8}$ inches)



FIG. 26.—The two sides probably of a weaving implement. (Length, with the point missing, 3 in.)

illustrated for the purpose of showing the grooving near the pointed end, which is always highly polished by wear (pl. xvi-xvii). So worn indeed are some of these implements that the hollow interior is exposed in some cases (*m, q, s*), indicating the long use to which they had been subjected. Many of the specimens, it will be seen, show several grooves caused by wear. This long and constant use is further indicated by the fact that hundreds of weaving bones from which the points had been broken after having been almost worn through, as well as points themselves, were found in the refuse-heaps of the village. Such a point, modified into a sharp awl which probably had been provided with a handle of bone, has already been mentioned and illustrated (pl. xiii, *i*), and in all probability the complete tool shown in pl. xvi, *b*, had been similarly hafted.

The use of the bone object illustrated in pl. xx, *b*, is not known with certainty, as the five tines with which the broader chisel-like end was provided, are broken off, but the punch-like narrower end is intact.



WEAVING TOOLS
 (Length of *i*, 7 $\frac{3}{4}$ inches)



WEAVING TOOLS
(Length of *x*, $5\frac{1}{8}$ inches)

Possibly this implement was designed primarily for use in weaving belts, garters, and such-like small fabrics, and the same may be said of the object shown in fig. 26, the

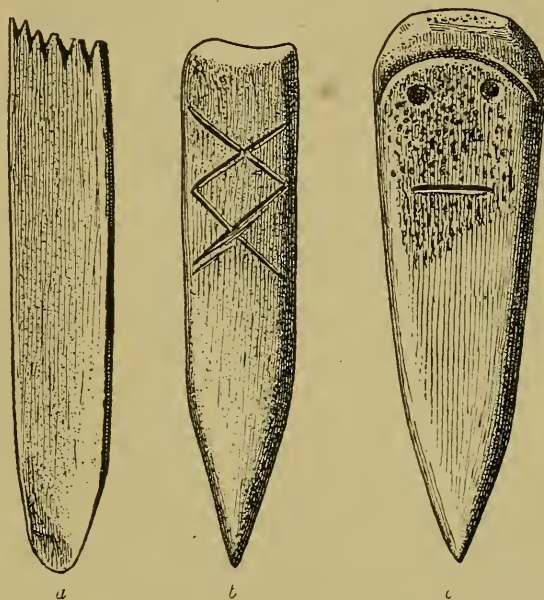


FIG. 27.—*a*, Implement toothed at one end, chisel-like at the other; *b*, *c*, Ornamented punches. (Length of *a*, $2\frac{1}{8}$ in.)

pointed end of which is likewise missing, although the notched end is intact. One side, it will be noted, has been rudely

106	HAWIKUH BONEWORK
	<p>scored, probably by way of ornamentation. Fig. 27, <i>a</i>, represents a similar implement, with a chisel-like proximal end. We will refer later to certain flat, toothed bones.</p> <p>PUNCHES AND ALLIED TOOLS</p> <p>There is little difference between the awls and that class of implements which we may designate as punches, excepting in the working end, which in the latter is more blunt than in the case of the awls, the points of which are oftentimes almost as sharp as a needle. As with some other implements, no fine distinction can be drawn between the awls and the punches, since some of the former are comparatively dull, while some of the punches are relatively sharp; and the same may be said of the relation between some of the punches and certain chisels.</p> <p>Bone punches of the commoner kinds are represented in pl. XVIII-XIX. Two short ones bear ornamentation, one of them (fig. 27, <i>b</i>) having crossed angular incised lines on its convex surface, the other (fig. 27, <i>c</i>) a face crudely represented at the articular</p>
III	INDIAN NOTES



PUNCH-LIKE IMPLEMENTS
(Length of *b*, $5\frac{3}{8}$ inches)



PUNCH-LIKE IMPLEMENTS
(Length of *h*, $4\frac{3}{4}$ inches)

end of its convex side. The punch shown in fig. 28 is made of an antler prong.

An excellent punch-like artifact is formed from a metatarsus of a prong-horn antelope without great modification of its natural form, as will be seen by reference to pl. xx, *a*. The band of sacred red paint just above the distal end suggests the use of this object for other than everyday use, probably as a dagger. There was no evidence that the instrument had been suspended, although the foramen which passes from the central groove through the condyle may well have served for the insertion of a thong for fastening to the person.



FIG. 28.—Punch made of antler. (Length $3\frac{1}{2}$ in.)

Punches of antler are numerous among

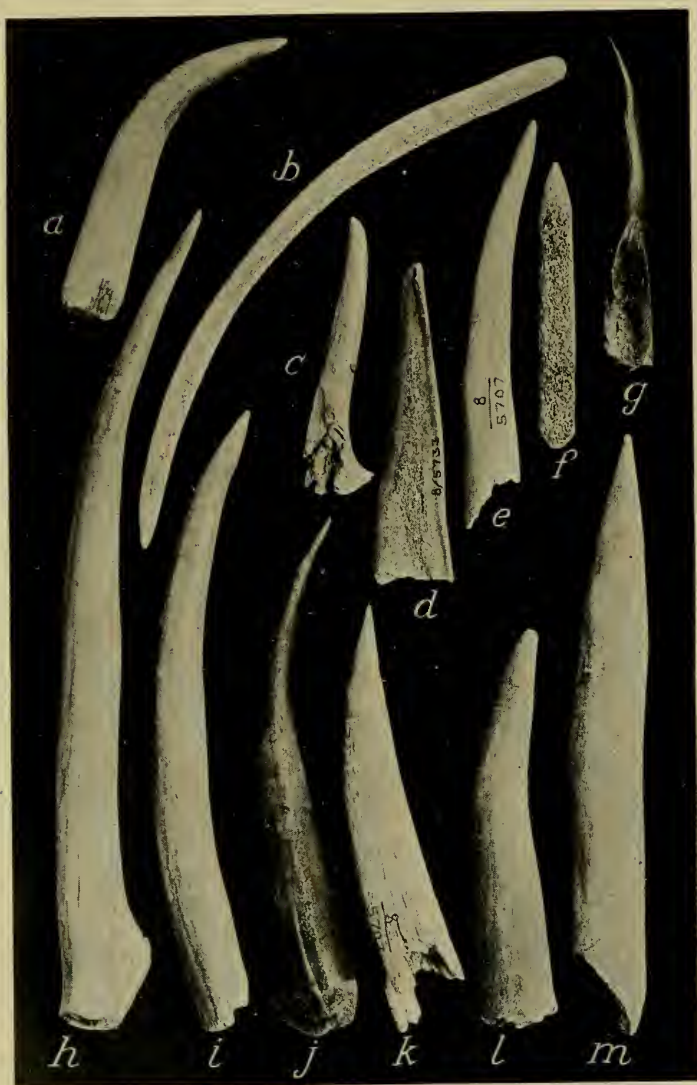
the Hawikuh material, and vary considerably in size and shape. Like those of bone, some of the punches made of antler have such close resemblance to awls that they are difficult to distinguish, so sharp are the points, but the shafts are sufficiently heavy to warrant classification of the implements as punches. This form of tool grades also into chisels, gouges, and flakers, and it is not unlikely that some of them were employed as polishers, while others may have been partly embedded in the plastered walls of dwellings to serve for hanging garments and various trappings. It should therefore be understood that when punches are alluded to, it is not necessarily meant that these tools were employed solely as such, but, like many other implements, may have had a multiplicity of uses.

Several punches of antler are presented in pl. XXI. Of these, *b*, *d*, and *f* illustrate punches made from antler that has been split lengthwise and rather considerably worked; the first has a blunt point and a dull chisel-like end, the second a somewhat sharper point, and a blunt end that may



VARIOUS ARTIFACTS OF BONE

(*a*, Punch-like implement or dagger, painted at the end; *b*, weaving tool (?) with the tines broken off; *c*, bone battered to shape in process of manufacture)



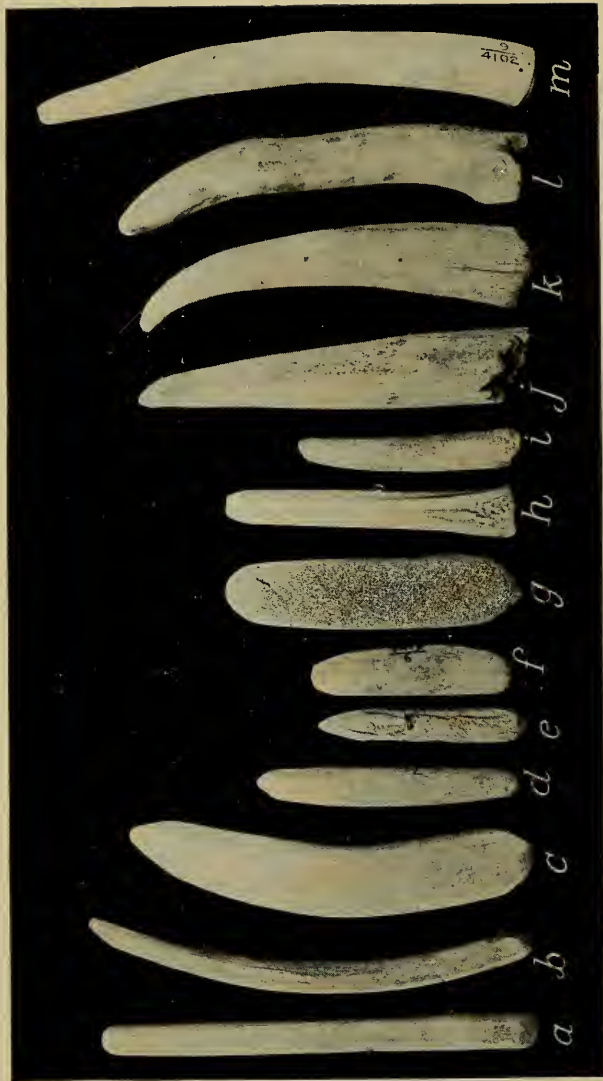
PUNCHES OF ANTLER
(Length of *i*, $7\frac{1}{4}$ inches)

have been used for chipping or flaking stone. Fig. *l* of the same plate shows an antler prong with five neatly incised lines surrounding the pointed half, as if for ornamentation, and *k* a prong also slightly incised for a like purpose.

An unusual punch-like object made from an antler of a mule deer, 10½ in. long in its present condition, is illustrated in pl. III, *b*. It seems to have been artificially straightened, and has been considerably smoothed. A prong that projected from its lower part was hacked off and the point of separation smoothed, and through the antler at this place and below were cut two crude oblong openings, the part containing the lower one of which has been broken partly away. The function of this artifact is not known, unless it was used as a punch, as suggested by the worn pointed end.

Among the punch-like objects of antler are those which generally are regarded as flaking or chipping implements, although this classification is not always made with certainty, because tools were not usually confined to a single use, as we have seen.

110	HAWIKUH BONEWORK
	<p data-bbox="306 245 925 682">The implements now referred to are too blunt as a rule for use even as punches, and they do not generally exhibit the polishing of the tip-end that came from constant rubbing against softer materials, as in weaving, the puncturing of tanned skins, basket-making, and the like, as in the case of many of the awls and true punches. A representative group of these tools is shown in pl. XXII, all of them of antler with the exception of <i>h</i>, which is of bone.</p> <p data-bbox="547 707 684 740">CHISELS</p> <p data-bbox="306 766 925 1286">The chisels of bone and of antler are of two classes—those beveled from both sides of the working end, and those that have been brought to an edge by grinding one side only. The first type is illustrated by a number of examples shown in pl. XXIII-XXIV (<i>a-c, e-h, l, m, o, r-t, v-z</i>), of which <i>n, o, and z</i> are of antler, the rest of bone. The chisel shown in <i>b</i> has fourteen shallow notches in one edge, and that in <i>e</i> nine scores similarly placed, as if tallies made by the owner. Each is fashioned from the proximal end of an ulna of the pronghorn</p>
III	INDIAN NOTES



PUNCHES OR FLAKING TOOLS OF ANTLER AND OF BONE
(All but *h* are of antler. Length of *a*, 5½ inches)

antelope. The antler chisel illustrated in *o* is marked with four scorings, extending about one-third around the circumference.

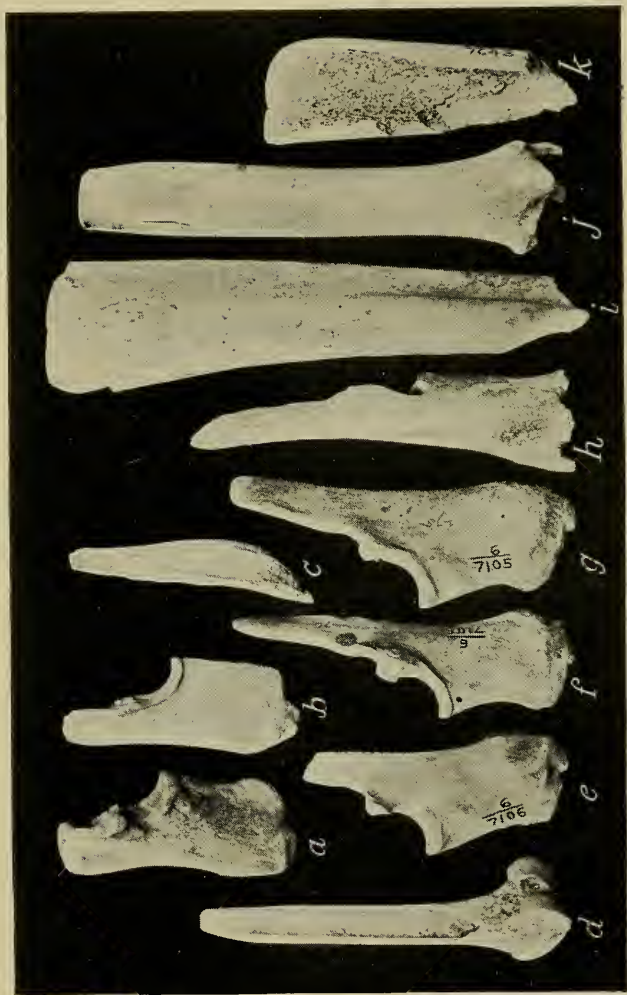
Chisels belonging to the second type are somewhat less numerous than those beveled from both sides, but they were made from similar haphazard bones. So far as observable, chisels strictly of this class were not made of antler. In some of the chisels there is little distinction between the two types, one edge being decidedly beveled, while the other has been ground very slightly (pl. XXIII, *g*, *h*, pl. XXIV, *w*, *y*).

It will be observed that the chisels, as in the case of the awls and the weaving bones, were made from practically any available bones, even splinters (pl. XXIII, *c*; pl. XXIV, *s*) not being despised.

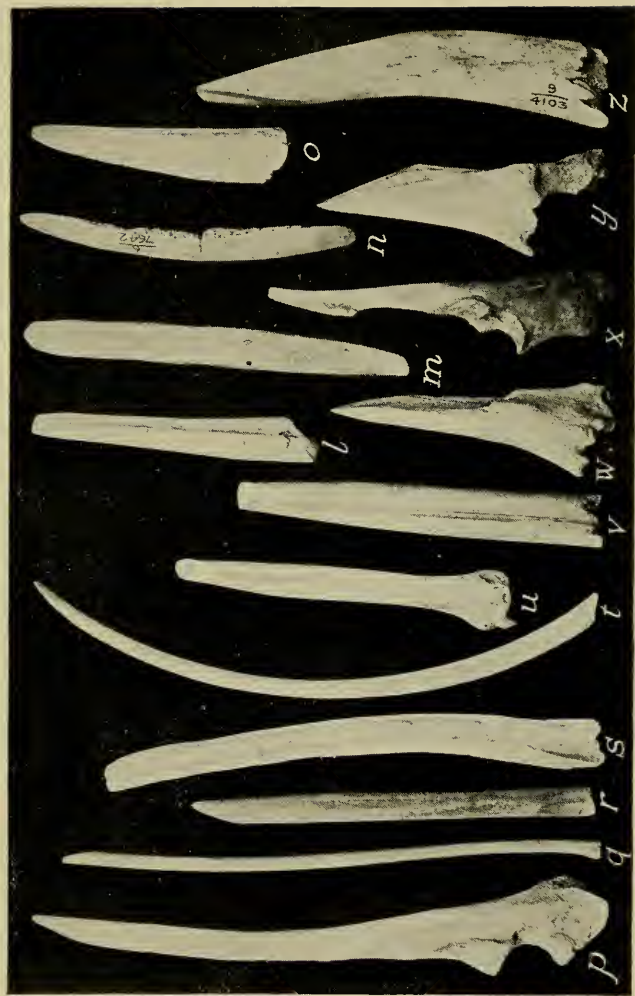
Examples showing decided beveling of one side only are given in pl. XXIII, *d*, *j*, *k*, and pl. XXIV, *l*, *p*, *q*. Of these, the first two have been ground so slightly on the opposite edge as to warrant their inclusion in the second type.

Belonging to the first type of chisels is the fine specimen shown in pl. III, *f*, which

112	HAWIKUH BONEWORK
	<p>measures $9\frac{3}{4}$ in. in length and is made from a metatarsus of a mule deer, split after grooving throughout most of its length, and ground to a rounded edge from both sides.</p> <p style="text-align: center;">KNIVES</p> <p>So far as they are made of bone, knives were very simple tools among the Hawikuh people. They consist usually of the ribs of deer, antelope, or bison, sharpened at one edge by limited whetting (pl. xxv, <i>a</i>, <i>b</i>, <i>d</i>, <i>f</i>, <i>g</i>, <i>i</i>, <i>j</i>, <i>l</i>, <i>m</i>, <i>o</i>, <i>p</i>), but receiving very little attention otherwise. The one shown in <i>l</i>, made from an antelope rib, has been considerably worn at both edges, one of which is rather regularly scored by means of a sharp implement, but whether this was for the purpose of affording a better cutting edge or for use as a tally, is not absolutely determinable, although the former is more probable, as the scored bones, with this exception, are always very plainly marked, as will be shown later. Fig. <i>m</i> illustrates a small knife evidently made from a piece of scapula, sharpened on two of its three edges. The knife shown in</p>
III	INDIAN NOTES



BONE CHISELS
(Length of *i*, 7 inches)



CHISELS OF BONE AND OF ANTLER
(Length of s, 6½ inches)

c of the plate, as is readily seen, is fashioned from an entire scapula of a Virginia deer, but more than half the blade has been cut or ground away.

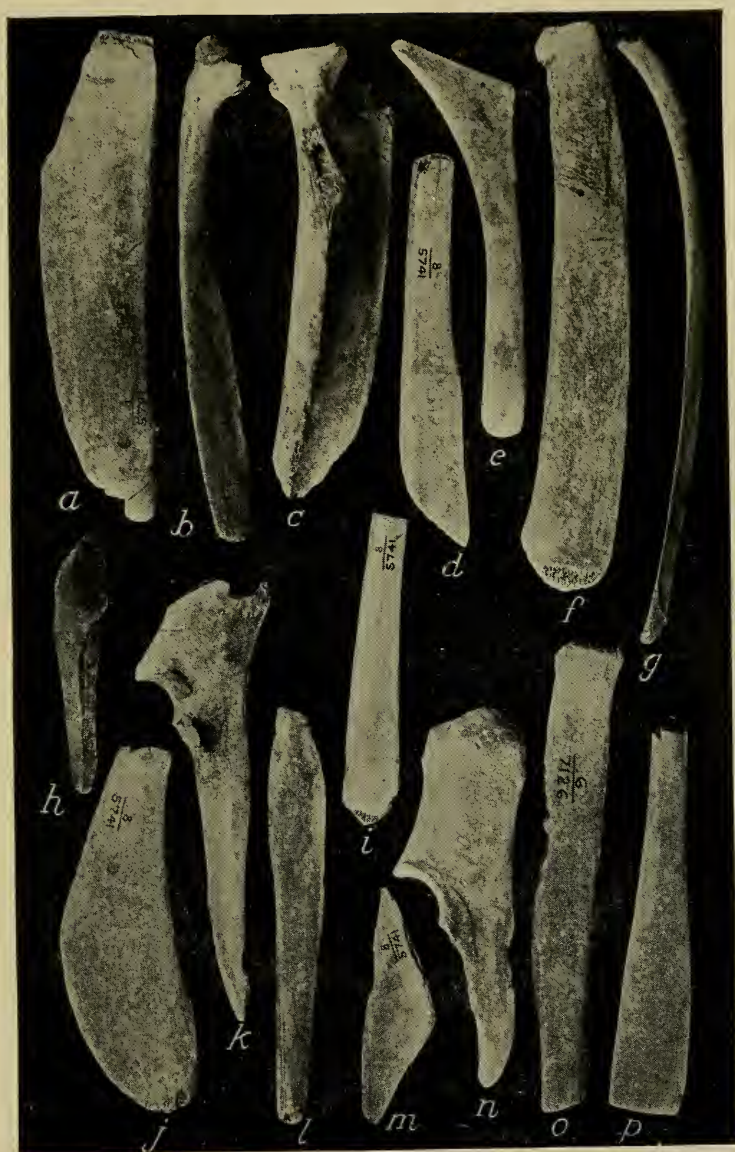
The peculiar object reproduced in *e*, made from the hyoid bone of a buffalo, may have served several uses; its smaller end is thin and rounded, while the straight and broader end shows indication of having been ground to an edge. With most bone implements, mere splinters were frequently adapted for use after slight alteration, and knives were no exception to the rule, as will be noted by examining *h* of pl. xxv. In fig. 29 is shown a knife made from a rib, pointed at one end for use as an awl, thus representing another tool designed for a double purpose.



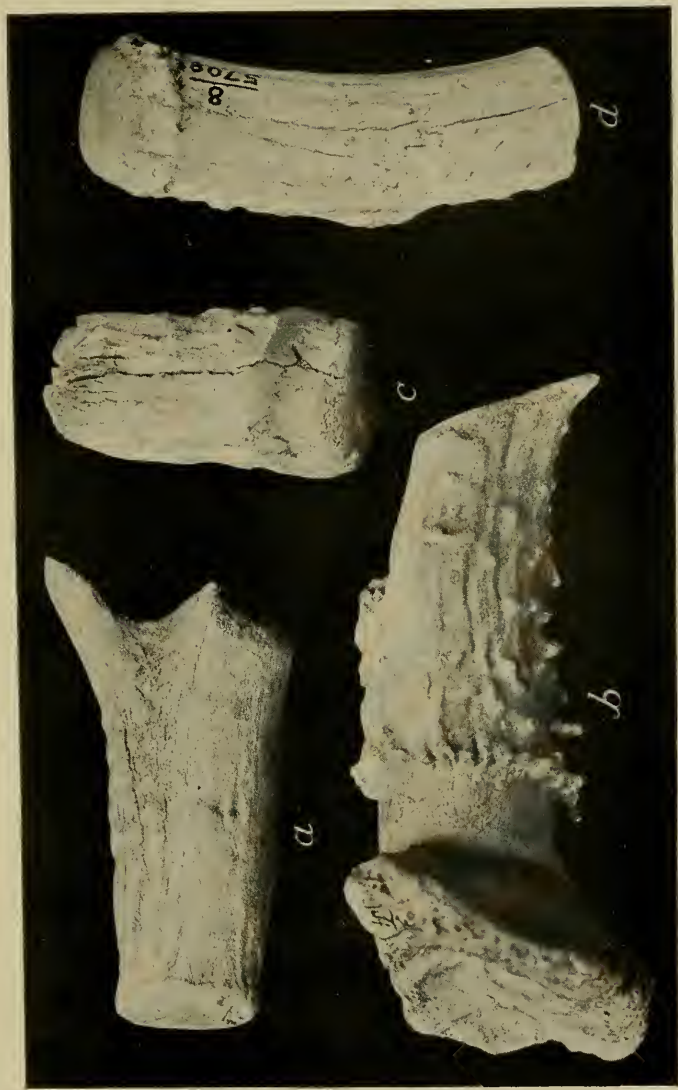
FIG. 29.—Awl-knife. (Length $5\frac{1}{4}$ in.)

Exceptional in the collections from Hawi-kuh, notwithstanding their adaptability to the purpose, are the ulnæ of pronghorn

114	HAWIKUH BONEWORK
	<p>antelope modified into knives by merely sharpening the edge. Two of these are here illustrated (pl. xxv, <i>k</i>, <i>n</i>), the end of the latter having been ground to a chisel-like edge, while that of the former is unworked. It is rather strange that other tools made from the same bones for use in one hand should be so numerous, while knives of this class are scarce. Some of the weaving implements previously referred to are likewise sharpened along the edges, but this, no doubt, is due to the same unintentional wear as that which resulted in the grooves on the shafts of these implements.</p> <p>RUBBERS AND POLISHERS</p> <p>For polishing the surfaces of various objects, with the possible exception of pottery vessels, for which pebbles were doubtless used as today, the basal ends of cut antlers were employed. Three specimens of antler polishers are here shown (p. xxvi, <i>a</i>, <i>c</i>, <i>d</i>), each with one or both ends rubbed smooth, while one of them (<i>c</i>) has its knobbed surface also worn down, and the prong of <i>a</i> has been ground to a chisel-like end.</p>
III	INDIAN NOTES



KNIVES
(Length of *f*, 7½ inches)



RUBBERS OF ANTLER

Possibly used as a rubber is the small bone shown in fig. 30, the angular end of which has been smoothed by attrition, as if employed for polishing small objects.

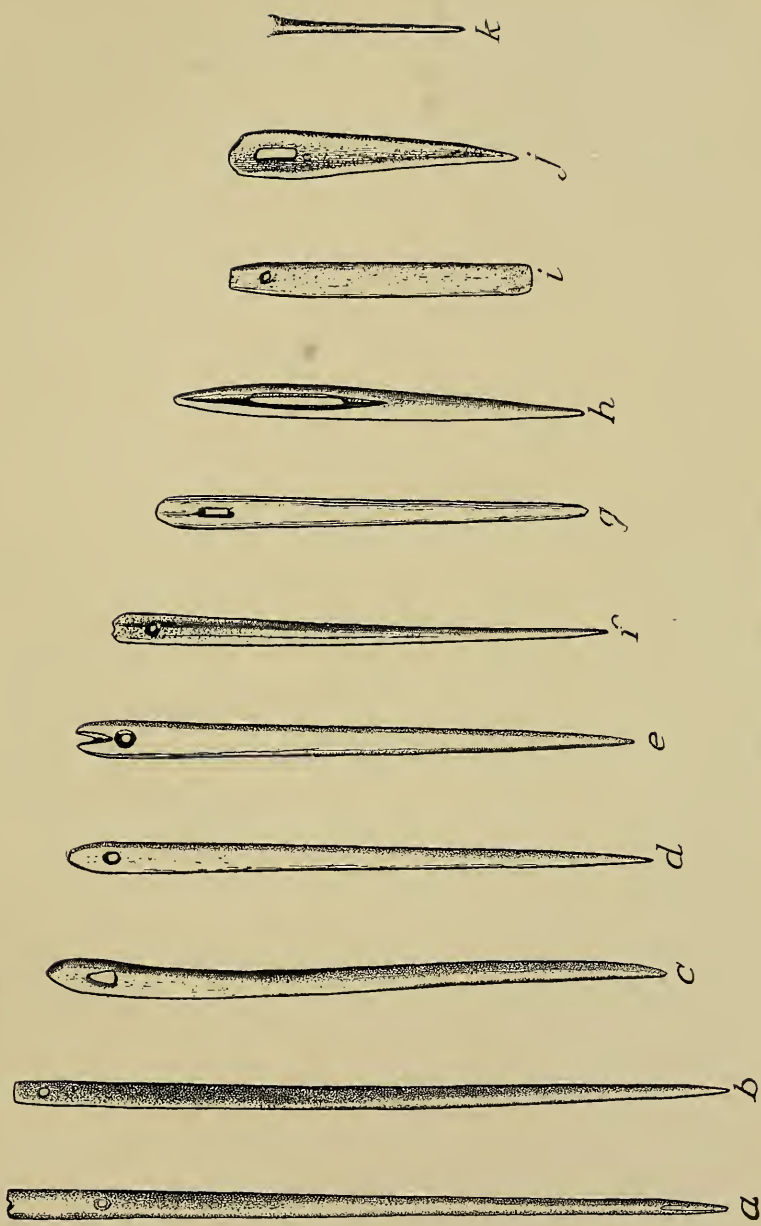
Doubtless various punches and weaving tools, as well as both the pointed ends and the butts of awls, were used likewise as polishers, and indeed any bone or antler tool with a surface adapted to the purpose, may have been employed similarly.

A crude object of uncertain use, but which seems to have served as a rubber or polisher, is shown in pl. xxvi, *b*. The antler of a mule deer, together with the attached portion of the skull, has been cut away and the upper part, where the antler was severed, smoothed by wear on the broken edges. It would have made an excellent wall hook, such as may still be seen at Zuñi, but



FIG. 30.—Rubber or polisher.

116	HAWIKUH BONEWORK
	<p data-bbox="308 248 928 460">had it been used as such, the upper surface, instead of the end, would exhibit abrasion, and the edges and inner surface of the cranial portion would have been protected from the wear it now shows.</p> <p data-bbox="542 500 694 527">NEEDLES</p> <p data-bbox="308 561 934 1155">Bone needles with eyes are not very common on Southwestern sites, but many, including sixteen entire (pl. xxvii-xxviii), have been found at Hawikuh. There is no reason to suppose that eyed needles were not used in prehistoric times by the Zuñi, as they were found at all levels in the refuse of the pueblo under discussion. Moreover, needles were only a step in advance of some of the more delicate awls, hence their use does not reflect progress in the manufacture or repair of textiles so much as the fabrics themselves. These will be treated in another paper.</p> <p data-bbox="314 1165 934 1290">The position of the eye varies in distance from one-sixteenth to eleven-sixteenths of an inch from the blunt end of the needle.</p>
III	INDIAN NOTES



NEEDLES AND BODKINS
(Four-fifths actual size)

Some of these implements show long use, as indicated by the wearing of the eye (pl.

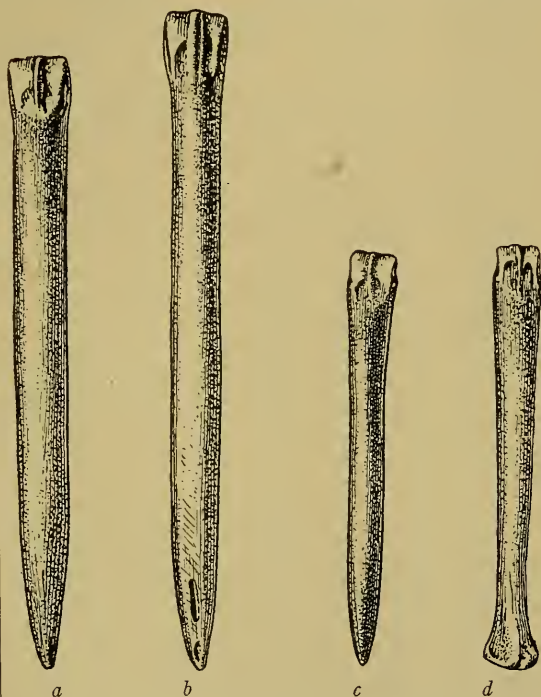


FIG. 31.—Pins made from metacarpal and metatarsal bones of the jackrabbit. *d* shows an unworked bone. (Length of *b*, $2\frac{1}{8}$ in.)

xxvii, *c*, *g*; pl. xxviii, *g*, *h*). Pl. xxvii, *i*, exhibits a needle so wide in comparison

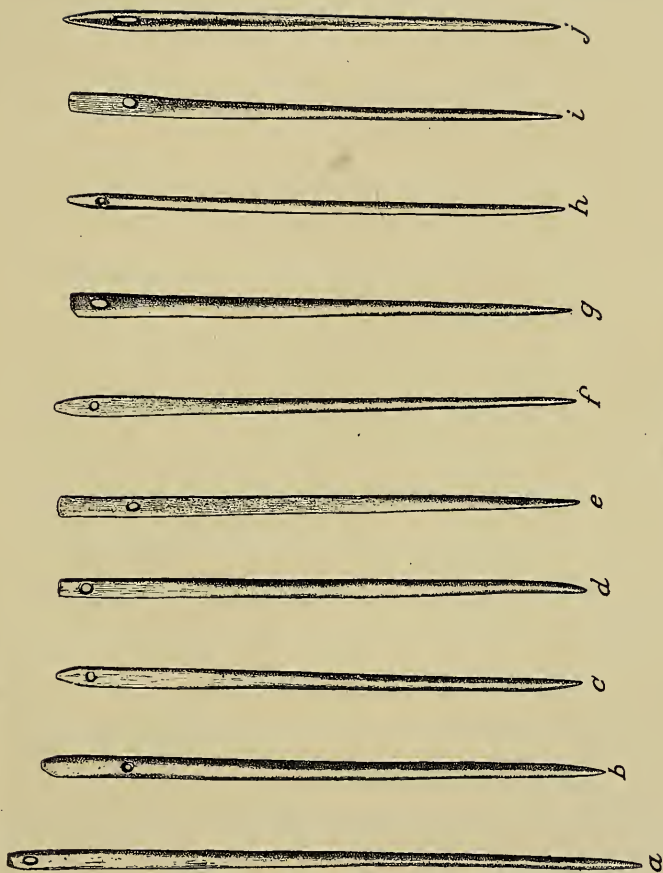


FIG. 32.—Pin.
(Actual size.)

with its length as to resemble a bodkin, except that, unlike the specimen in *h*, it is not pointed. The needle shown in pl. XXVII, *e*, has the appearance of having been broken at the eye and redrilled for further use; but close examination shows that this is not the case, the notch evidently having been made for some other purpose, perhaps to accommodate the thread at this thicker end of the needle for finer work.

PINS

Pins were common in the Hawikuh refuse, hundreds having been found. They are exceedingly limited in variety, since they were fashioned almost exclusively from the metacarpal and metatarsal bones of the jackrabbit by merely rubbing one of the articular ends to a blunt point. The illustrations (fig. 31) show (*d*) such a bone unmodified; (*c*) the same kind of bone with



NEEDLES
(About one-half actual size)

one end ground down; and (*a*, *b*) two bones with somewhat different points. The pin shown in fig. 32 is unique in that it is the only one in the collection made probably from a phalangeal bone of a young deer.

ARROWS

In his letter of August 3, 1540, to the Viceroy, Coronado says: "I send you samples of the weapons with which the natives of this country [of Cibola] fight, a shield, a hammer, and a bow with some arrows, among which there are two with bone points, the like of which have never been seen, according to what these conquerors say." In the prosecution of the work at Hawikuh, therefore, we were not surprised to find an arrow-point of bone with neatly serrated edges (fig. 33), and also what seem to be two finished points of antler (fig. 34) and two others in process of making (fig. 35), as both the latter show evi-



FIG. 33.—Arrow-point. (Actual size.)

dence of an attempt to reduce the natural curvature of the antler tip. One of the arrowpoints (fig. 34, *a*), it will be seen, has a shank-like projection at the shaft-end,

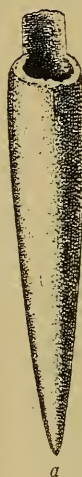


FIG. 34.—Arrowpoints of antler. (Actual size.)



FIG. 35.—Unfinished arrowpoints of antler. (Actual size.)

partly broken off, and the blunt end is hollowed as if to receive the shaft. The smaller antler point is hollowed also, and the larger end is smoothed, but is without the projection.

TUBES

The tubes and beads of bone are distinguishable only by their size, and indeed this alone is not always indicative of the use of these neatly cut hollow bones, since some of the shorter ones were undoubtedly used as beads, and, fastened together, as wrist-guards. The segregation of the two, therefore, is quite arbitrary. For our purpose a tube may be defined as any hollow bone of reasonable length that has been artificially finished at both ends. In length the tubes vary from a couple of inches to about seven inches, the smaller ones merging into the larger forms of beads. In diameter they range from one-tenth to five-eighths of an inch. The bones employed were usually the femur, ulna, or radius of the turkey; but a femur of a chicken and a humerus of a coyote are so cut at the ends as to suggest that in each case a part had been taken for bead-making, although this is by no means certain.

The purpose of the tubes may only be conjectured. Some of them, no doubt,

122	HAWIKUH BONEWORK
	<p>were worked merely in preparation for bead-making in the manner previously described (page 73), or as flutes or whistles; others may have been used as sucking or drinking tubes, and certainly some of the shorter ones were employed as handles for awls, as we have already seen, and as is further shown in the three illustrated in fig. 36, all well polished from use. A selection of the plain tubes is presented in pl. XXIX for the purpose of showing their size and general character.</p> <p>Tubes were rarely embellished by their Hawikuh makers, only five that bear ornamentation of any description having been found; these are shown in pl. xxx, <i>b-f</i>. One of them (<i>f</i>) has a simple figure scratched in one side; <i>d</i> has two bands containing zigzag designs, one at each end, extending about two-thirds around the circumference. The notched end of the tube shown in <i>c</i> is somewhat similar to that in <i>b</i>, and in both specimens the notching extends entirely around, but only one of the scratched lines on the former specimen surrounds it entirely, while the two sets of</p>
III	INDIAN NOTES



PLAIN TUBES
(Length of the longest, 7 inches)





ORNAMENTED TUBES AND WHISTLES
(Length of *a*, $4\frac{1}{8}$ inches)

parallel lines shown near the ends of *b* pass only halfway, and midway between the two

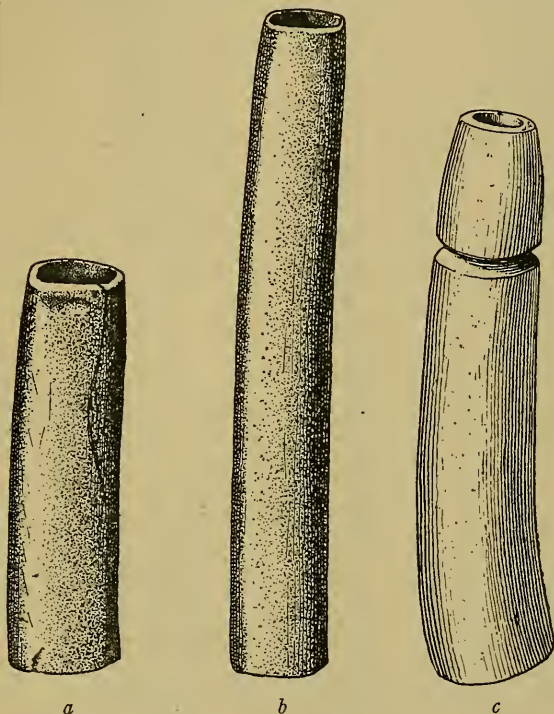


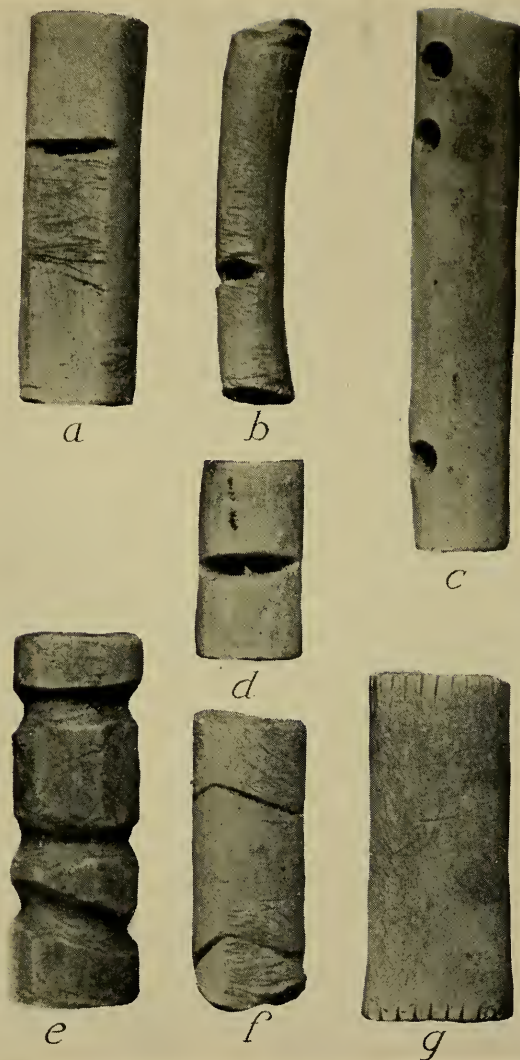
FIG. 36.—Handles for awls. (Length of *c*, $2\frac{1}{2}$ in.)

sets is a small pit made by drilling. Similarly ornamented objects will be referred to in treating of the beads.

Two tubes, unique in the collection, are illustrated in pl. xxx, *a, e*. These resemble, in a measure, some of the musical instruments to be described, excepting that *a* has a drilled aperture half an inch from each end, entirely through the greater diameter, possibly for use as some form of pendant. Such probable use is accentuated by the fact that the edges of the drilled openings are polished as if by a thong. The two openings in the other interesting object have been cut by sawing evidently with an edged stone, while the intervening sections are ornamented with zigzag or crossed lines. The other side of the tube is plain.

Somewhat similar in form to the bird-calls to be described are the three specimens presented in pl. xxxi, *b-d*, which may be nothing more than attempts to cut the tubes to form shorter beads, although all are more or less polished by wear at the ends.

The tube (pl. xxxi, *c*) with the three opposite pairs of holes, all drilled from without, not through from side to side, is unique in the collection of Hawikuh bone objects. It does not appear to have been used as a



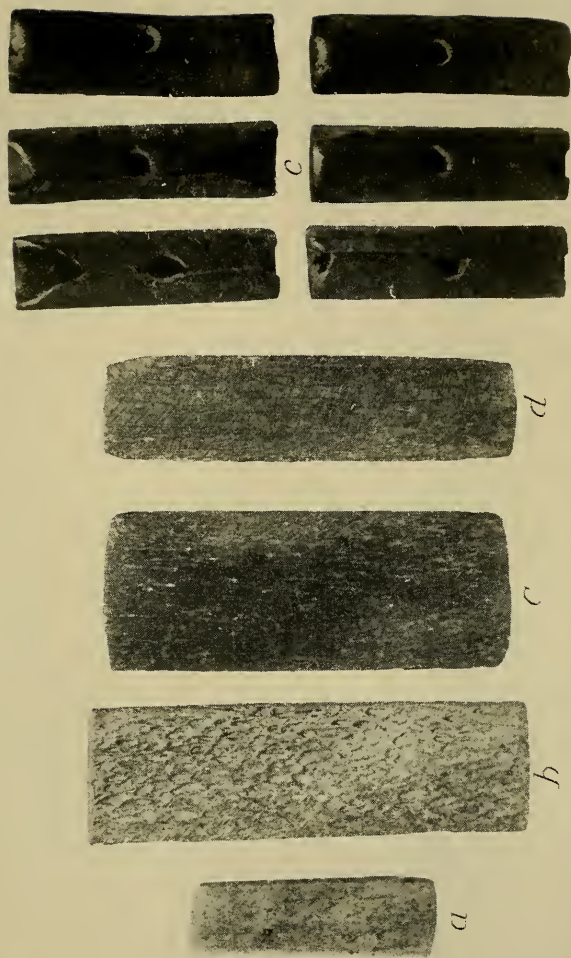
SMALL ORNAMENTED OR PERFORATED TUBES OR BEADS
(Slightly enlarged)



TUBES FORMING A WRIST-GUARD
(Enlarged. The length of the individual tubes averages $1\frac{1}{2}$ inch)

TUBES	125
<p>handle and that the holes were designed for pins to hold a blade or a point firmly in its socket, nor does it seem adapted for use as a musical instrument.</p> <p>The most elaborately carved tube or bead is shown in <i>e</i> of the same plate. Fig. <i>g</i> illustrates one almost as long, faintly incised halfway around each end; and <i>f</i>, rudely cut at the ends, bears more or less rounded zigzag bands by way of ornamentation. It is possible that this specimen is only a fragment of a longer tube that had been broken, and that the part here shown was made to do further service as a bead, with which class of ornaments it may as readily be placed as among the tubes.</p> <p>We now reach a class of hollow bone objects which, if size were the only criterion, might likewise be classed either as tubes or as beads. Fortunately the use of some of these, at least, is known, for they were found in varying numbers on the wrists of skeletons, in one case on the wrist of an individual whom the Zuñi at once identified as that of a Priest of the Bow (Apihlanshi-</p>	
AND MONOGRAPHS	3

126	HAWIKUH BONEWORK
	<p>wani) by reason of the character of the artifacts that accompanied the burial.</p> <p>These wrist-guard beads or tubes are all shorter than the longest of those that had been strung as necklaces, and vary in length from an inch to an inch and a half. Altogether six bone wrist-guards were found, four on the left wrist, one on the right, and one not determined. The component pieces of the respective wrist-guards number respectively six, seven, nine, eleven, thirteen, and eighteen. In form these were of two varieties—plain cylindrical (pl. xxxii), and flattish (pl. xxxiii, <i>e</i>), the latter drilled centrally through the slightly convex side. One of the plain wrist-guards (pl. xxxii) is illustrated exactly as found.</p> <p>It may be mentioned here that wrist-guards or wrist ornaments were not always of bone, one being found on the right wrist of another Priest of the Bow, made of shell and juniper-seed beads in alternating rows.</p> <p>FLUTES, WHISTLES, AND BIRD-CALLS</p> <p>The only wind instruments used by the Hawikuh people were flutes, whistles, and</p>
III	INDIAN NOTES



TABLETS (*a-d*) AND PERFORATED TUBES USED ON A WRIST-GUARD (*e*)
(Slightly enlarged)

FLUTES	127
<p>“bird-calls” of bone, and large flutes of reeds. The bone instruments alone concern us here.</p> <p>The flutes, made from <i>ulnæ</i> of the turkey, range in size from three and seven-eighths to seven inches in length, and have vents varying in number from one to five (pl. xxxiv). In only two instances has any attempt at ornamentation been made, and that in the crudest manner by scoring the surface with oblique lines in the intervals formed by the vents of one (<i>e</i>), and with plain lines extending halfway round the other (<i>i</i>). There are a few incised lines on still another (<i>h</i>), but these do not appear to have been made for embellishment.</p> <p>One of the only true whistles found is illustrated in pl. xxxv, <i>p</i>. What may have been the beginning of a whistle is the tube shown in pl. xxxiv, <i>k</i>, although, on the other hand, this may represent merely a rude attempt to sever the end of the bone in making a bead. There are similar examples in the collection.</p> <p>No attempt has yet been made to deter-</p>	
AND MONOGRAPHS	3

mine the musical possibilities of any of the instruments mentioned.

Related in a measure to the flutes and the whistles, and indeed they are actually whistles, although blown from the side, are the bird-calls, which were found in considerable numbers. That these instru-

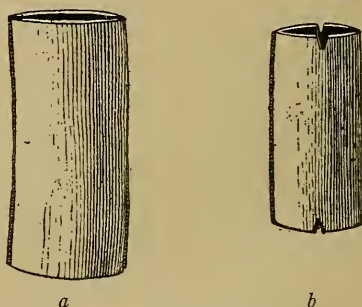


FIG. 37.—Bitsitsi whistles. (Actual size.)

ments were used by hunters for attracting birds and possibly certain mammals, there seems to be no doubt, as each of two old Zuñi men, asked separately how they were employed, immediately put one to use, producing a shrill whistling note.

In every instance the vent is centrally, or almost centrally, placed, and usually it



FLUTES AND WHISTLES
(Length of *e*, $6\frac{3}{8}$ inches)

has been rather carelessly drilled or gouged out, as will be seen by some of the examples shown in pl. xxxv. A few of these (*b-d*, *g*, *h*, *k*) have double vents, one opposite the other, and because some of them show more

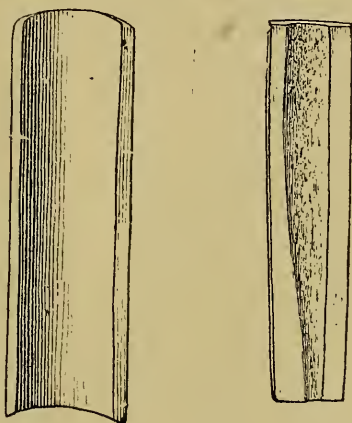


FIG. 38.—Half-tubes probably used as whistles.
(Actual size.)

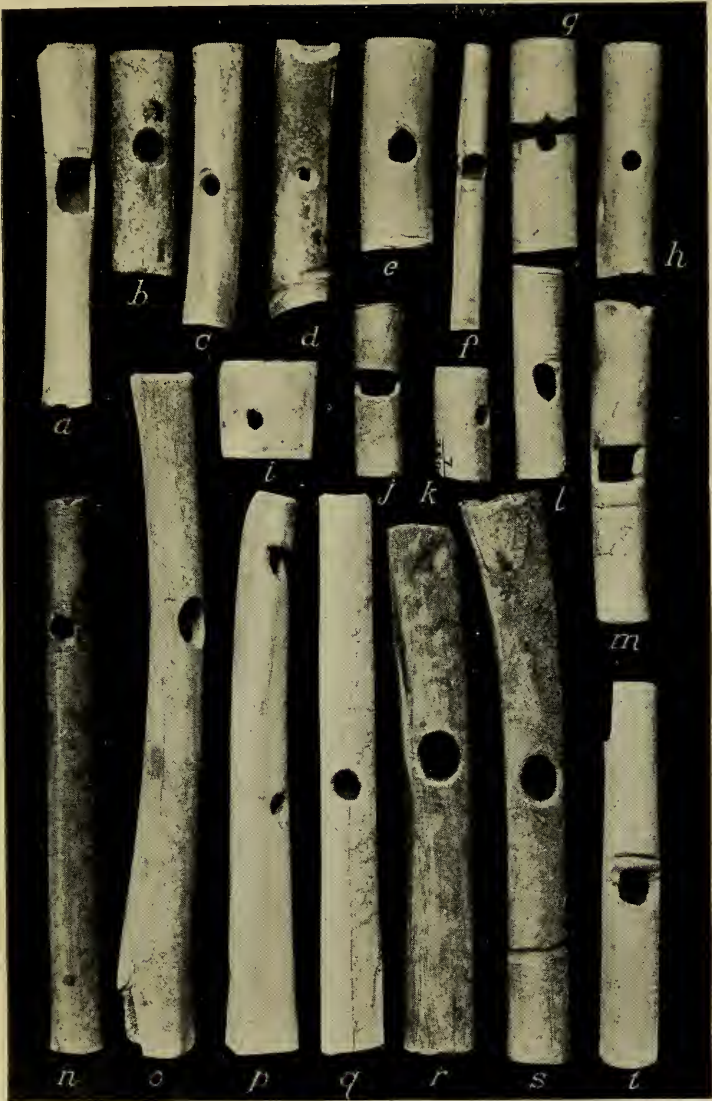
or less polish about the aperture, they may have been used as beads or pendants, but this is uncertain. The drilling of the specimen shown in pl. xxxv, *k*, suggests its use as a bead rather than as a bird-call; it is one of the doubly-drilled specimens that

not only exhibit wear about the vents, but more or less polish inside as well. Fig. 39 of the same plate shows a particularly interesting example in that it still retains its original wrapping of hair cord about the middle to prevent breaking, the object having become cracked from end to end in two opposite places.

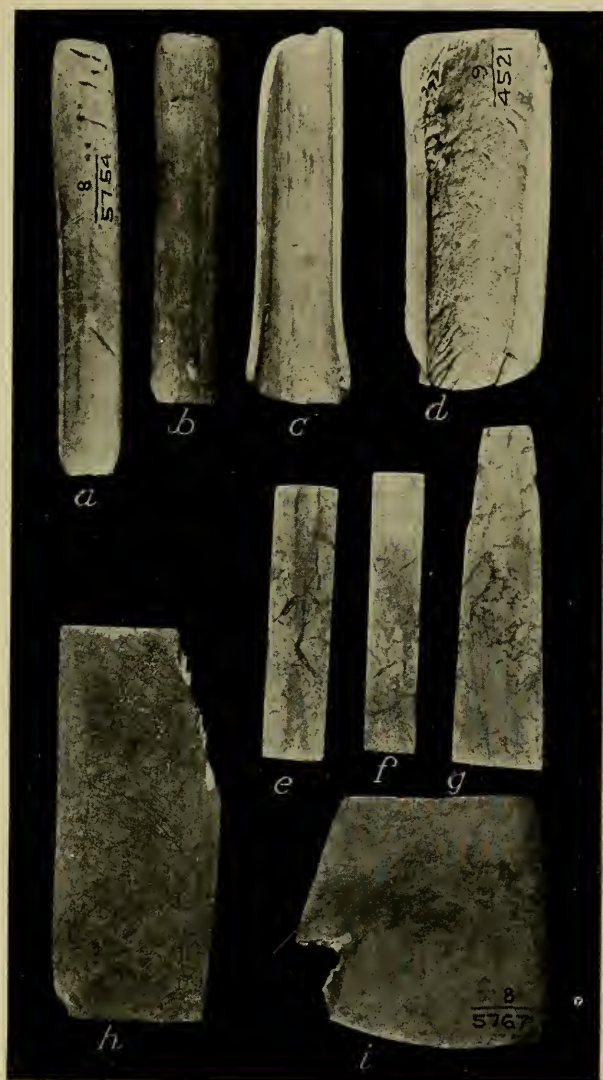


FIG. 39.—Bones probably used as whistles.
(Slightly reduced.)

We now reach a class of whistles consisting of two oblong pieces of bone, slightly concave on one side, so that when tied together, the concave sides inward, the instrument was ready for use by blowing in one end: Such a whistle is in use at Zuñi today by the Bítsitsi, a personage associated with the Mólawia ceremony of the



BIRDCALLS AND WHISTLES
(Length of *n*, $4\frac{1}{8}$ inches)



SMALL CONCAVE AND TABLET-LIKE FORMS
(Length of *h*, $2\frac{3}{8}$ inches)

Shálako rites, excepting that it is made of "vegetable matter" instead of bone.⁵ Of those illustrated, fig. 37 represents two pairs that fit perfectly, while the edges of all the others are straight and smooth

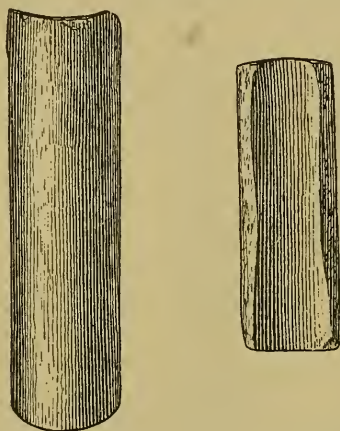


FIG. 40.—Bones probably used as whistles.
(Actual size.)

enough to have served with similar pieces (fig. 38-40). It will be observed that one of the pairs (fig. 37, *b*) is notched slightly at one end, as in the case of the modern one illustrated by Mrs Stevenson, while two others, not of the same size (fig. 41), are

more deeply notched in the side, near the end.

Objects similar in form.—Related more or less in form to the slightly concave pairs of bone objects are the flat or flattish ones illustrated in pl. XXXIII, *a-d*, all but the first showing the spongy process on one

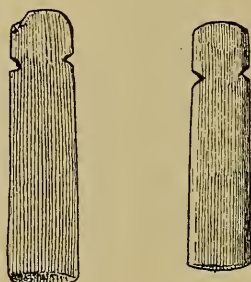


FIG. 41.—Notched bones probably used as whistles. (Actual size.)

face. None of these were found in pairs, and their use is not known. They exhibit no markings. Other forms of the same general kind of objects are represented in pl. XXXVI, *e-i*, all with squared edges, with the exception of the last,

which may have been used as a scraper. Pl. LIII, *l*, is also of the same class, but unusual in that it is made from part of the plastron of a mud-turtle or a tortoise and blackened by fire. Originally it was a pendant, as shown by the remaining part of a drilled hole near one corner. We will



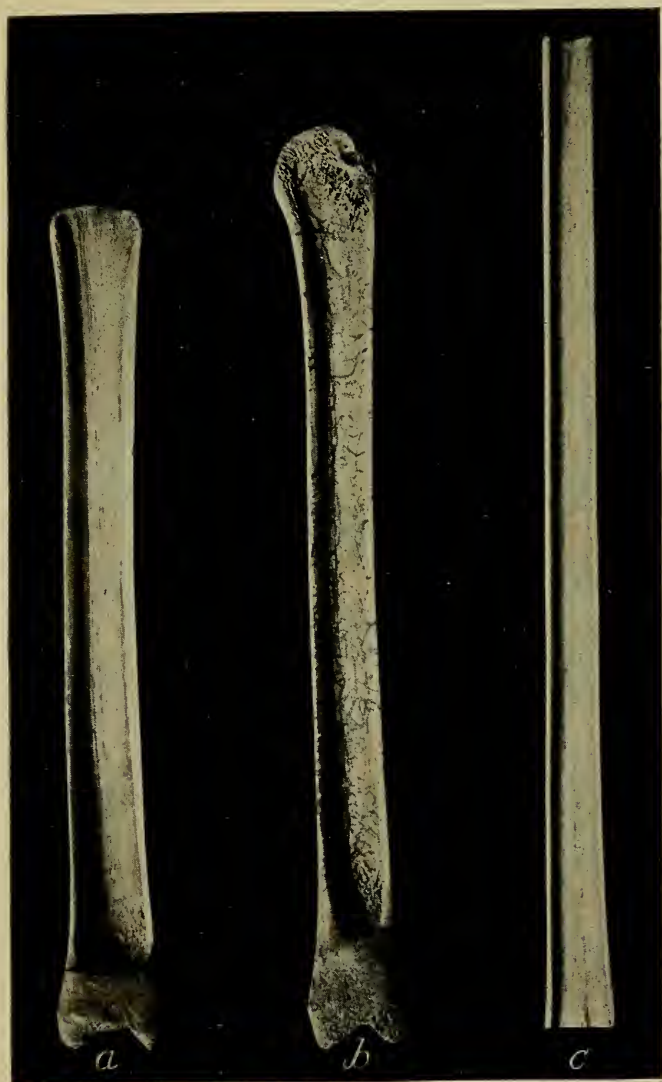
BEADS
(Length of *m*, nearly 2 inches)



BEADS
(Length of *c*, $2\frac{1}{2}$ inches)

B E A D S	133
<p>refer later to certain perforated pendants having the same shape as some of these oblong bone objects, which indeed may be unfinished examples.</p> <p style="text-align: center;">BEADS</p> <p>We have already called attention to the fact that the turkey-bone tubes and beads grade one into another, the only difference being the arbitrary one of length. We have also mentioned and illustrated the process of bead-making as consisting merely of scoring and severing any hollow bone the desired length, and rubbing the ends smooth. A selection of beads is presented in pl. xxxvii-xxxviii, with a view of showing their general forms and size. Of these, pl. xxxvii, <i>b</i>, exhibits the first step in bead-making, the bone having been cut and severed, but not rubbed smooth. Pl. xxxviii, <i>f</i>, is a bead that evidently has been made from part of a flute; pl. xxxvii, <i>f</i>, <i>i</i>, <i>l</i>, and xxxviii, <i>v</i>, have been blackened by fire, while one of these has been drilled near one end. Pl. xxxviii, <i>q</i>, shows a bead within another—</p>	
A N D M O N O G R A P H S	3

134	HAWIKUH BONEWORK
	<p>one of three such examples. Some of the beads are rather nicely finished, while others are as crudely made as possible.</p> <p>Many of the hundreds of beads recovered were found in the refuse-heaps, while others were in the graves, having formed necklaces of the dead. It has already been shown that certain forms of long thin beads or short tubes were employed as wrist-guards; others of the same kind were used as neck ornaments.</p> <p style="text-align: center;">SCOOP-LIKE OBJECTS</p> <p>Larger, more concave on one side, and without the straight edges that characterize some of the others, is the form of half-tubes shown in pl. xxxvi, <i>a</i>, <i>c</i>, the use of which is not known, unless they were employed as scoops or scrapers of some kind.</p> <p>Pl. xxxvi, <i>d</i>, is a much heavier kind, made of a section of leg-bone by splitting and rubbing lengthwise, and the ends have also been rubbed until somewhat rounded. This object may have been used as a smoothing or polishing implement.</p>
III	INDIAN NOTES



SCOOP-LIKE OBJECTS
(Length of *c*, $6\frac{5}{8}$ inches)

H O O K S	135
<p>Somewhat resembling the last in cross-section are the three scoop- or gouge-like specimens represented in pl. XXXIX, the exact function of which may only be conjectured. Of the three specimens, <i>a</i> and <i>b</i>, at least, were made from femora of the wild-cat, or lynx, the condyle having been removed and the proximal portion worked down.</p> <p style="text-align: center;">H O O K S</p> <p>Two rather interesting hook-like objects are shown in pl. XL, <i>b</i>, <i>c</i>, the former made from a carpo-metacarpus of the turkey and only slightly worked or worn, the latter from a human ischium, also showing slight modification of its original form. Had the former been found in the eastern part of the country, it may have been regarded as a fishhook, but this does not explain its possible use in Zuñiland, as the Zuñi had no fish larger than minnows in their river and springs, and they would not have used them as food if they had, for not until very recent years did they eat any aquatic creature, on account of religious restrictions.</p>	
A N D M O N O G R A P H S	3

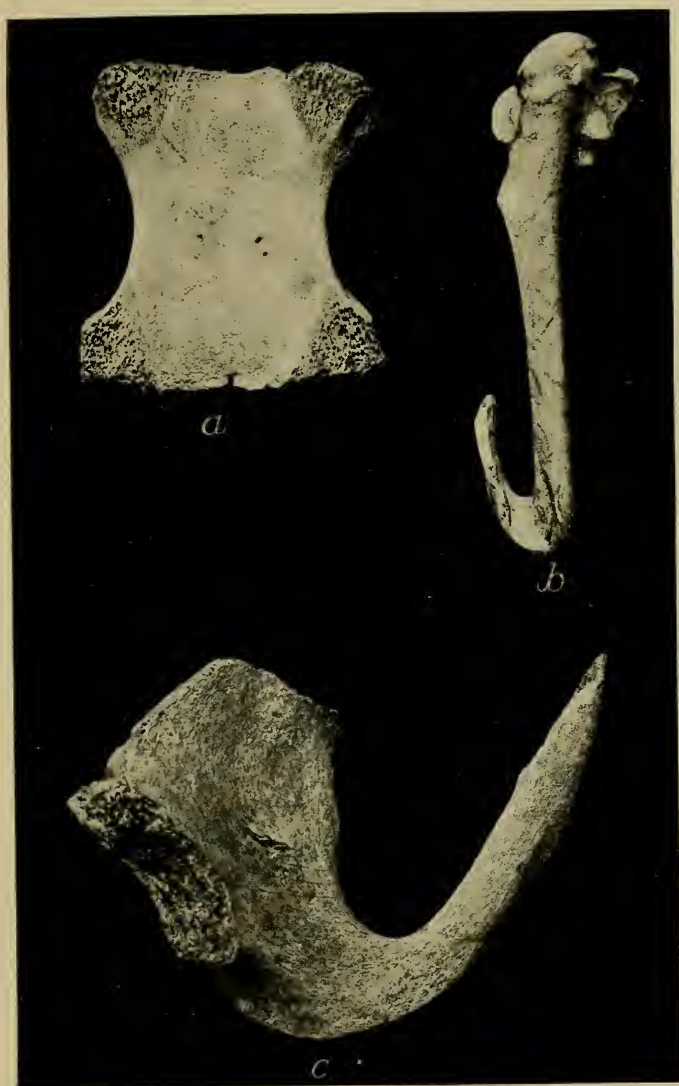
HANDLES

We have already described and illustrated certain handles used for awls. There are a few others that have been employed in

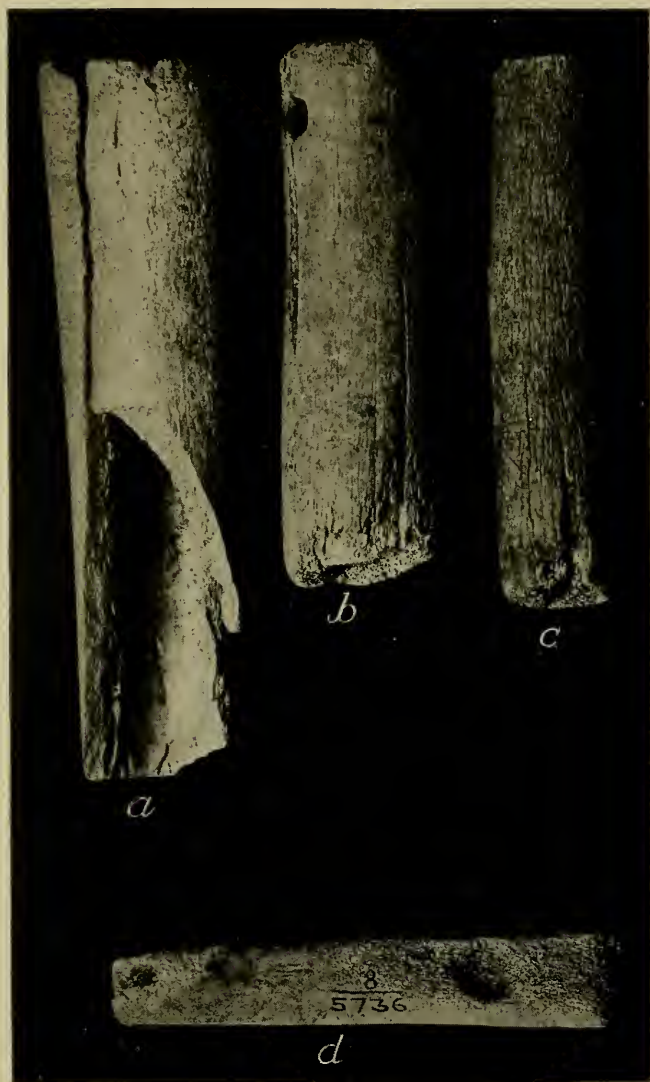


FIG. 42.—Hollowed and carved handle of antler. (Length $5\frac{1}{2}$ in.)

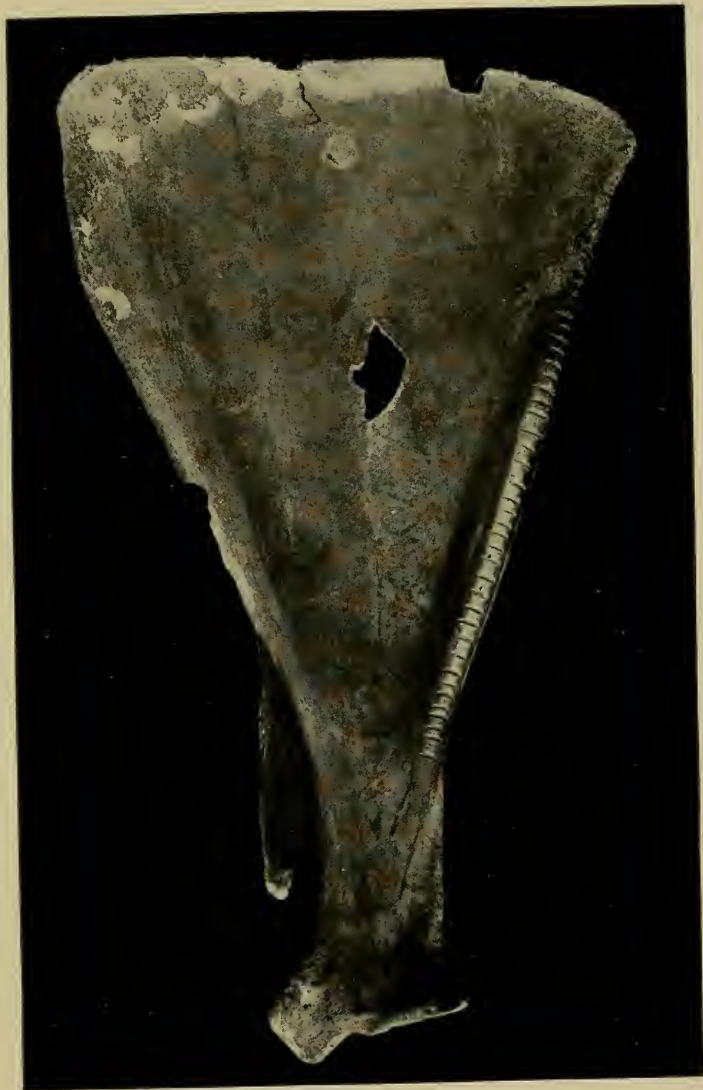
connection with knives or other implements, if we may judge by the size and shape of the opening in one end. The most interesting of these is the handle of antler illustrated in fig. 42, which has been nicely hollowed out, drilled from both sides to receive pegs, possibly of wood, to hold the blade or point in place, and the tapering end cut to represent the head of an animal. Another antler handle (pl. xli, *b*) has been drilled entirely through one end, from both sides, to afford means of suspension. From the inside polish in both ends, the crude handle of bone exhibited in *a* of the same plate was used after the



REEL AND HOOKS
(Diameter of *a*, $1\frac{3}{4}$ inch)



HANDLES OF BONE (*a*) AND OF ANTLER (*b-d*)
(Length of *a*, $4\frac{3}{8}$ inches)



NOTCHED SCAPULA OF A DEER

smaller and more highly polished end had become broken. Fig. *d* represents a handle that had received a thin blade, possibly of metal, although it shows no stain, and that illustrated in *c* no doubt received a larger thin knife-blade of iron, as the rust-stained slit in one end indicates.

NOTCHED BONES

Twenty-six scapulæ or parts of scapulæ of western Virginia deer and western mule deer, as well as ten other mammal bones, all scored or notched, were found among the thousands of bones in the refuse-heaps and houses of Hawikuh. Most of these were doubtless used as rasping sticks, or saw-fiddles, such as are employed by the Zuñi and other tribes today as accompaniments to songs and dances, while others seem to have been tallies for recording events or for keeping count of objects or articles. The writer knows of the use of notched sticks and knotted strings in Zuñi in recent years for recording the passage of time by days and for noting the number of sheep

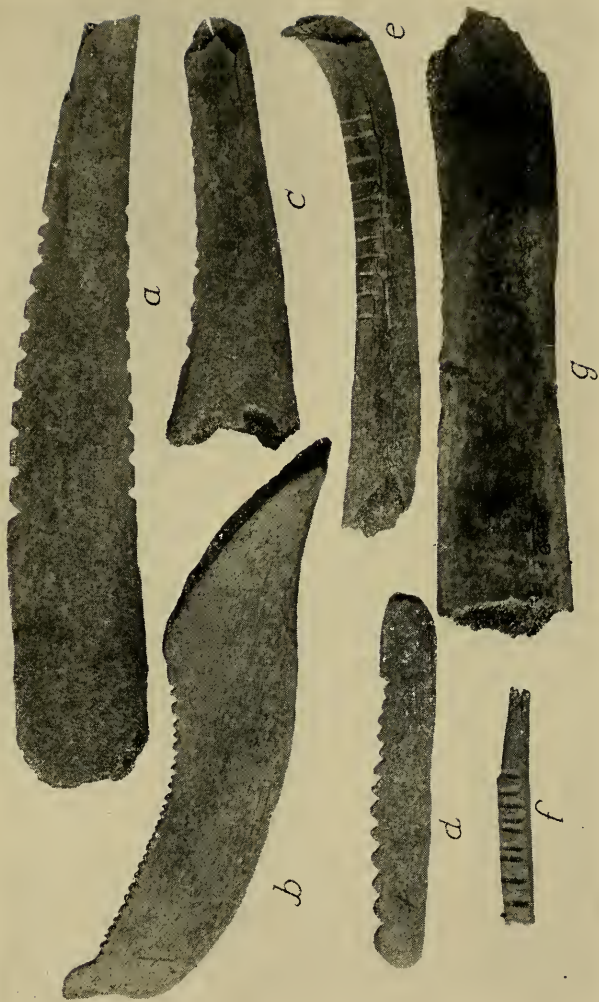
owned, hence it is not unlikely that bones were similarly used in former times.

Lumholtz⁶ writes of the use of similar bones by the Huichol Indians of Mexico, who employ them as an accompaniment to a deer-hunting song. "The rubbing of two notched deer-bones is considered an efficacious accompaniment to the hunting song, and is often used, the noise being thought to decoy the deer into the snare. The shoulder-blade is held with the right hand by the spine and rubbed against the notched bone held in the left hand."

The most perfect of the scored scapulæ is that shown in pl. XLII, from a mule deer, which has forty-four notches on its ridged part, where indeed all the scapulæ are scored. Drawn across the edge of a resonant board or a box, or a piece of wood held over a gourd, the familiar rasping sound is produced, and indeed the ridge in which the notches are made is so polished in this specimen, as well as in most of the others, that it would be difficult to account for its smoothness in any other way. Nevertheless, the notching is by no means



NOTCHED SCAPULAE
(Length of *a*, 6½ inches)



NOTCHED BONES OTHER THAN SCAPULAE
(Length of *b*, 7 inches)

NOTCHED BONES	139
<p>so deep and coarse as that of the rasping sticks used by the Zuñi at the present time. Other specimens of notched scapulæ are represented in pl. XLIII, <i>a-f, h</i>, all of which exhibit wear of the ridge. Figs. <i>b</i> and <i>h</i> have been so abraded that their use as instruments of accompaniment is apparent. An exceptional specimen is shown in <i>g</i>, by reason of the small number of notches, the fact that the sharper part of the ridge is worked, and that the edge shows no wear. It is therefore likely that this particular object was a tally.</p> <p>Scored or notched bones other than scapulæ are herein illustrated. Pl. XLIV, <i>f</i>, is a portion of a leg-bone that has been broken; figs. <i>a, c-e</i>, are parts of ribs of various mammals, but in no example does the notched edge exhibit wear as by rasping. Fig. <i>g</i>, part of a bison rib, has been delicately and sharply scored with a keen implement and has been considerably worn on the notched edge. Fig. <i>b</i>, part of the pelvis of a bison, notched along its concave border and the point finished to a chisel-like edge, likewise exhibits considerable polish from</p>	
AND MONOGRAPHS	3

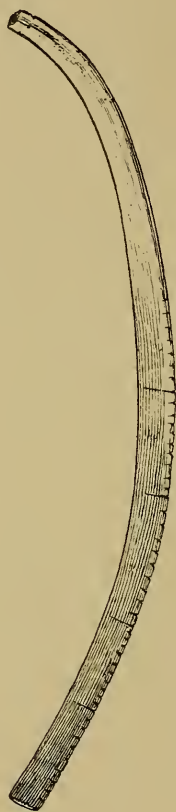
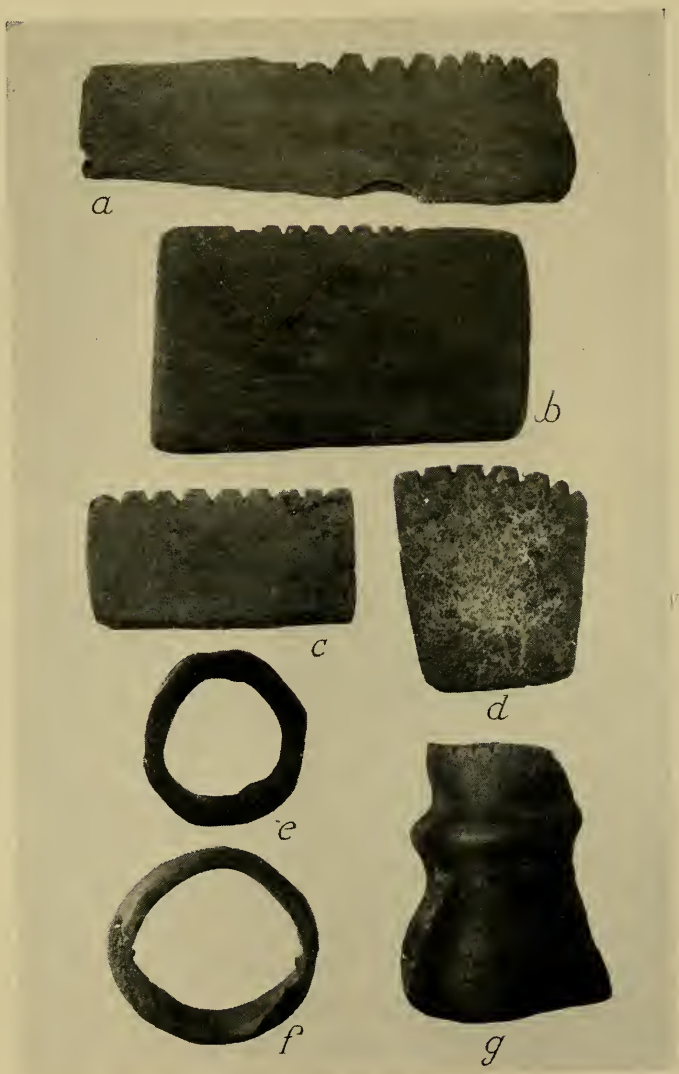


FIG. 43.—Antelope rib used as a tally. (Length 10 in.)

use. The Zuñi workmen regarded this as a saw, but it would certainly not prove effectual as such.

The specimen shown in fig. 43, the rib of a pronghorn antelope, was undoubtedly a tally; the flattened end is faintly notched with thirty marks, the three sets of ten being separated by two longer marks, although the first ten markings from one end are almost obliterated.

Notched bones of another kind, which apparently were neither musical instruments nor tallies, are shown in pl. XLV, *a-d*. It is not likely that these were used in weaving belts, garters, and such-like small textiles, otherwise they would indicate wear of the teeth, which they do not. The one



VARIOUS NOTCHED BONES, AND RINGS
(Length of *a*, $2\frac{3}{8}$ inches)



PAINTED BONES

PAINTED BONES	141
<p>shown in <i>a</i> may have been broken at the serrated end after having been notched, but if so, it was subjected to further use, as this end shows wear. Some of these objects may have been used as head-scratchers.</p> <p>Still another notched bone is presented in pl. XLV, <i>g</i>, being the anterior distal portion of the left humerus of a mule deer, rather faintly incised at the end and also on the ridge. The use to which this object was put is not known.</p> <p style="text-align: center;">PAINTED BONES</p> <p>The Zuñi had the custom, which is still practised to some extent at least, when a hunter killed his first game, of painting one of the bones of the animal with sacred paint—red or black, or both. That the same custom prevailed at Hawikuh in ancient times is indicated by the finding of a number of painted bones of mammals, three of which are shown in pl. XLVI, XLVII. These are part of the scapula of a deer striped with black (pl. XLVI, <i>a</i>), the atlas of a coyote tipped with black (<i>b</i>), and the lower jaw of an antelope with black and red stripes</p>	
AND MONOGRAPHS	3

142	HAWIKUH BONEWORK
	<p>on one side (pl. XLVII). Pl. XLVIII illustrates the horn-core of a domestic goat, blackened at the tip, but whether it was deliberately so treated is not known. In addition to these, there is an antler punch with a painted band in black near the pointed end; a lower maxillary of a mule deer completely covered with red paint; an ilium with part of the ischium, also of a mule deer, that had been similarly painted but most of the paint has been washed or worn off; and a deer scapula that bears several bands in black on both sides.</p> <p style="text-align: center;">GAMING BONES</p> <p>Two gaming implements (pl. XLIX), each made from a shin-bone of a young deer, and with eleven and eight lines, respectively, incised across the flat face, were found together in the refuse. Doubtless these were used in a game more or less similar to the present <i>shóliwe</i>, in which four split and marked reeds or tablets are employed; but the Zuñi were unable to identify the game in which the incised bones had actually been used, and believed that it had become obsolete.</p>
III	INDIAN NOTES



PAINTED ANTELOPE JAW



HORN-CORE OF DOMESTIC GOAT WITH PAINTED TIP



TWO PAIRS OF GAMING BONES

EFFIGIES

Reference has already been made and illustrations given of certain implements with ends carved to represent the Shumaikoli and certain animal heads. In addition there are two calcanea of antelope, each grotesquely carved at one end in representation of the head of an animal (pl. I, *b*, *c*), while a third (*a*), the external proximal portion of the right femur of a mule deer and which may possibly be the handle end of an implement, is cut to indicate the mask of a Kóyemashi, so often seen in Zuñi ceremonies today. In this object the knobs on the head are shown, likewise the prominent, round eyes and mouth, characteristic of these sacred clowns.

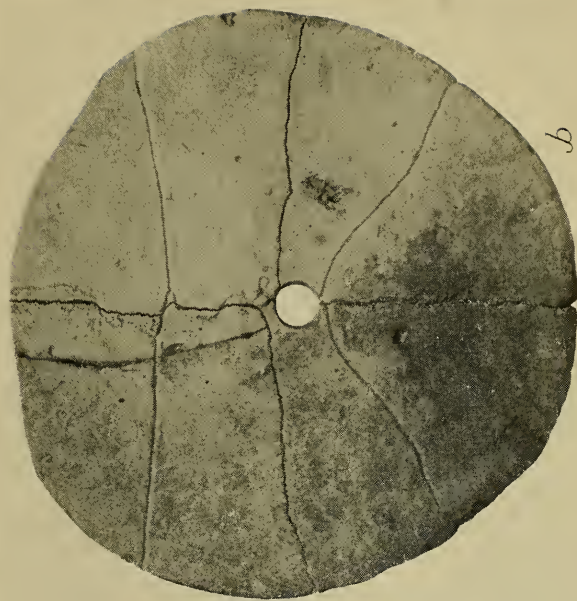
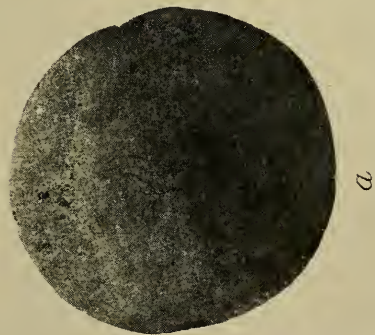


FIG. 44.—Bone cut to resemble a centipede. (Length $4\frac{1}{2}$ in.)

144	HAWIKUH BONEWORK
	<p data-bbox="327 248 951 766">An interesting specimen cut in semblance of a centipede is illustrated in fig. 44. The legs are indicated by shallow notches along the sides almost throughout the length; the mouth is hollowed deeply, the neck is emphasized by slight grooves, and the eyes by small pits. The tail-end of the bone has been left almost undisturbed, as if it had been designed for some practical use, such as arrow-chipping; or it may have been left in its present state to prevent exposure of the hollow interior of the bone, as in the case of the mouth.</p> <p data-bbox="515 794 788 824">SPINDLE WHORL</p> <p data-bbox="327 853 951 1290">Cut from the plastron of a mud-turtle (<i>Chrysemys</i>) is a whorl for a spindle or a pump-drill, $3\frac{3}{4}$ in. in maximum diameter (pl. LI, <i>b</i>). The shell of the tortoise or the turtle was used only to a slight extent at Hawikuh, the spindle-whorl and the few other objects of that material herein described being the only ones thus far encountered, although many unworked pieces have been found in the refuse. Potsherds were generally used for whorls, perhaps because</p>
III	INDIAN NOTES



DEER AND ANTELOPE BONES CARVED TO REPRESENT A KÓYEMASHI AND TWO ANIMALS



DISC MADE FROM SKULL, AND SPINDLE-WHORL MADE FROM TORTOISE PLASTRON
(Diameter of *b*, $3\frac{3}{4}$ inches)

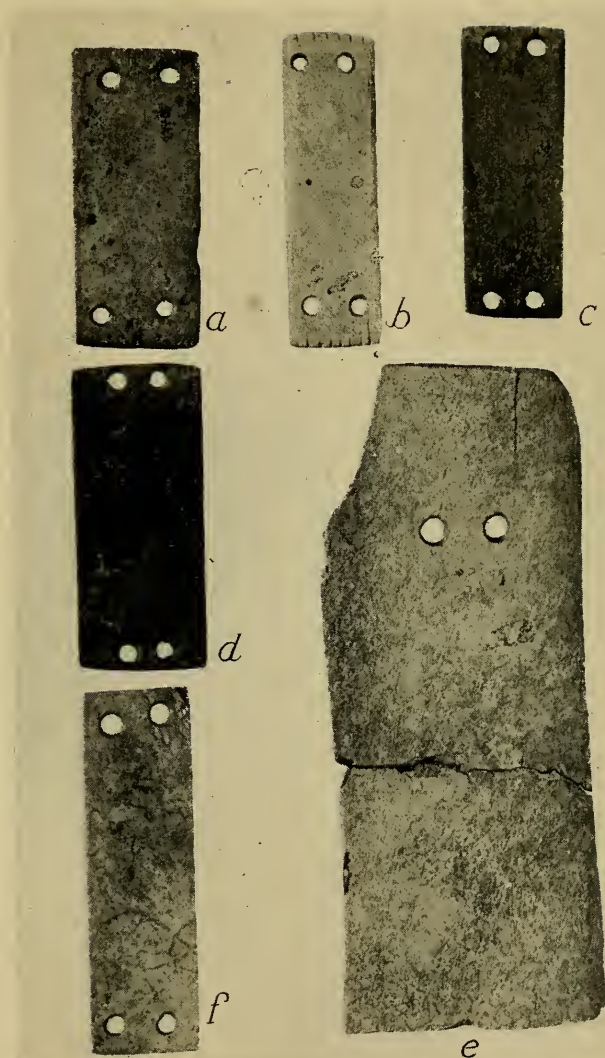
O R N A M E N T S	145
<p>of their availability and the ease with which they could be worked, but stone whorls are also found. Other tortoise-shell artifacts will be mentioned in connection with miscellaneous objects.</p> <p style="text-align: center;">ORNAMENTS</p> <p><i>Rings.</i>—Two bone rings (pl. XLV, <i>e, f</i>) were found, the larger having a drilled hole, as though designed for suspension by that means. Judging by the unworked condition of the inside, and their general crudeness, it is unlikely that these rings were worn on the fingers; indeed, it is not improbable that they are merely unusually large and narrow beads.</p> <p><i>Pendants.</i>—Most common among the pendants of bone are those perforated at each corner, as shown in pl. LII, <i>a-d, f</i>. They are all quite flat and smooth on both sides, and three (<i>b, c, d</i>) are faintly incised at one end or both, on one face only. Of this variety, with the four drilled holes, eleven were found, six of them together amid a sacrificial deposit of broken pottery vessels without human remains.</p>	
A N D M O N O G R A P H S	3

The other thin oblong pendants vary in the number of their perforations, as will be seen by reference to pl. LIII, *g-k*. The last of these appears to have belonged to the type with four drillings, but was broken in two and smoothed at the fractured end.

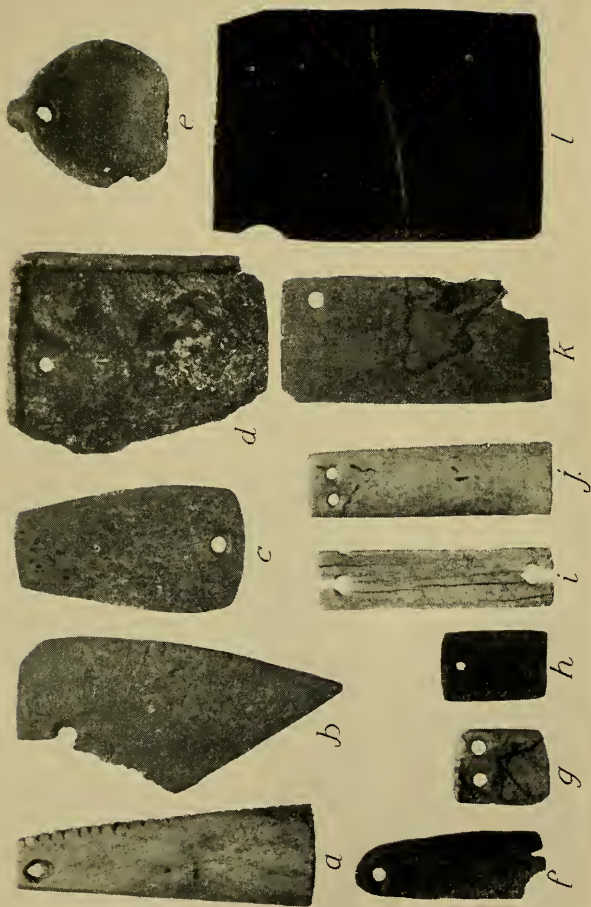
Pl. LIII, *c, f*, show two pendants with rounded edges, and *b*, part of a heart-shaped one. Fig. *e* of pl. LII, made from part of a rib, thicker at one edge than at the other, speaks for itself. It measures $1\frac{1}{4}$ by $3\frac{1}{4}$ inches.

A neat pendant, cut from a tapering hollow bone (pl. LIII, *a*), is drilled at its narrow end and bears incised marks along three edges.

Another pendant, part of which is missing (pl. LIII, *d*), was found in the charred refuse surrounding various cremations beneath the northern refuse-heap of the pueblo, and itself had been burned. Carved with a raised framelike border and perforated at the top, this object in all probability once held a mosaic of turquoise such as were found, only with wooden bases, and in one instance with a base of shell, in some



PENDANTS
(Length of *f*, $1\frac{3}{4}$ inches)



VARIOUS FORMS OF PENDANTS
(Length of *a*, about $1\frac{5}{8}$ inches)

O R N A M E N T S	147
<p>of the graves. These will be treated in another paper.</p> <p>Totally different in kind are two pendants of grizzly-bear tusks (pl. LIV), one (<i>e</i>) grooved centrally, the other (<i>f</i>) split in two lengthwise and drilled for suspension.</p> <p>What may have served as pendants, because drilled at one end, are two worked pieces of antler, one of which is shown in pl. LIV, <i>d</i>, and two small bones, unworked, save as to their perforation, and which may have had some supposed potent influence. One of the latter is shown in pl. LIV, <i>c</i>.</p> <p>Curious pendants are those illustrated in pl. LIII, <i>e</i>, and LIV, <i>a</i>, <i>b</i>. The first mentioned is a drilled intervertebral disc of the axis of a pronghorn antelope; the second, the anterior portion of the mandible of a wildcat (<i>Felis [ruffa?]</i>), with two incisors; and the third, the occipital portion of the skull of a wildcat. Possibly each was believed to possess certain magic power attributed to the animal to which it belonged; at any rate, such a surmise is quite consonant with Zuñi belief. Possibly the disc represented in pl. LI, <i>a</i>, made from a section</p>	
A N D M O N O G R A P H S	3

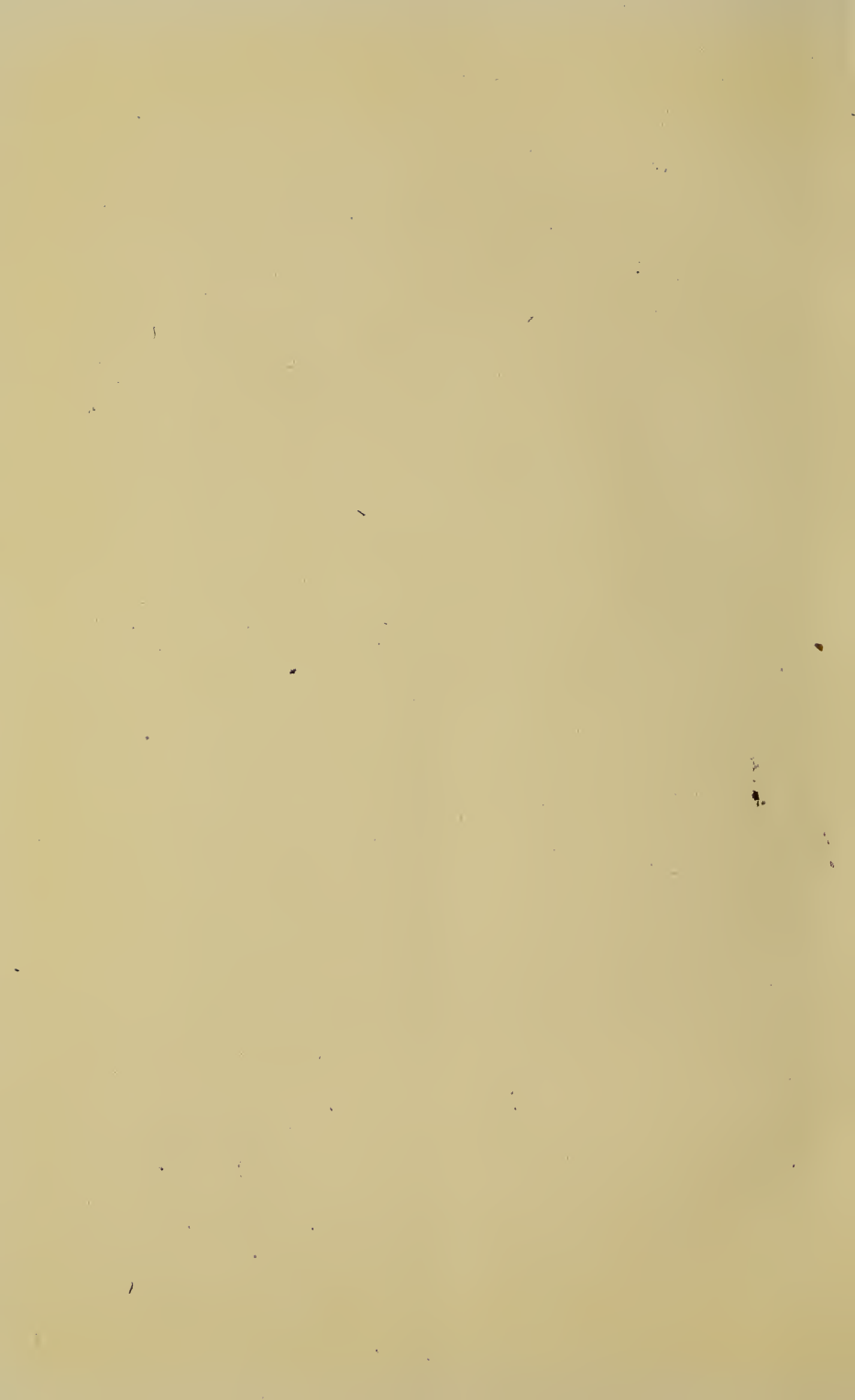
148	HAWIKUH BONEWORK
	<p>of an unidentified skull, was designed as a pendant, but remained unfinished, as it is not perforated for suspension.</p> <p><i>Head-dress.</i>—For want of a better name is a fillet made of six, rounded, circular pieces of antler (?), which was found, greatly decayed, over the skull of an adult. The position of the pieces was such as to indicate that they had formed the hemispherical framework of a head-dress, as there were remains of vegetal material in association, and there are still traces of fiber wrapping around the ends of these segments. The occurrence in the same grave of a cup containing green and blue paint, and of two manos that had been used for grinding blue paint, sheds no light on what character the head-dress may have been, as sacred paint was found very commonly in Hawikuh graves, both prehistoric and recent. In this connection, however, we may mention the finding of two graves, recognized by some of the Zuñi as those of "deer chiefs," which contained numerous antlers of deer, in each case covering the body almost from head to foot (pl. LV, LVI).</p>
III	INDIAN NOTES

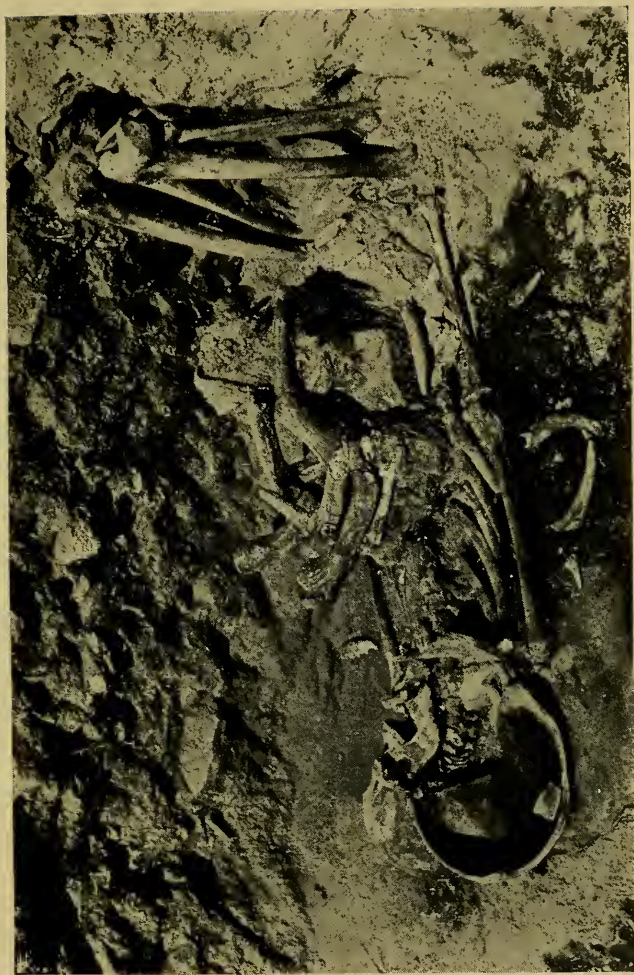


VARIOUS FORMS OF PENDANTS



BURIAL WITH DEPOSIT OF ANTLERS

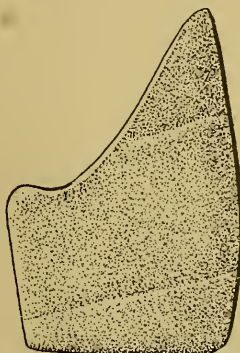




BURIAL WITH DEPOSIT OF ANTLERS

MISCELLANEOUS OBJECTS

We may here mention a smaller object of tortoise plastron, shown in fig. 45, of curious shape, and no doubt used as a scraper, as two of its edges are considerably beveled by wear. Other fragments of tortoise-shell in the collection show artificial working of the margin, and in one instance a central perforation as though designed for use as a gorget-like ornament. None of these are in any way decorated.



No suggestion of the use of the object shown in pl. XL, *a*, can be offered unless it was used as a reel for winding sinew or other sewing material. It is made from the fourth sternal rib of an antelope.

FIG. 45.—Scraper made from tortoise plastron. (Actual size.)

CONCLUSION

The chief interest in the bone objects from Hawikuh lies in the fact that, coming

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	<p>as they do from a pueblo inhabited from prehistoric time to the year 1670, they show very little effect of Spanish contact, although explorers were coming and going for a period of 130 years, and Franciscan missionaries dwelt at Hawikuh for 41 years. Indeed, the only influence of the Spaniards, as shown by the bonework of Hawikuh, is the substitution of a few iron awls and possibly of knives inserted in bone handles, in place of tools made entirely of bone. Yet there is no doubt that, while these objects of civilization met with favor among the natives, they were in limited number, and the manufacture and use of bone implements and ornaments continued until Hawikuh was abandoned. The bone objects from this pueblo, therefore, tell the same story as practically all the Indian artifacts thus far found, regardless of their character. The native pottery in no wise was superseded by glass or china; the stone masonry was not replaced by the superior adobe construction of the church and monastery, excepting in one insignificant instance, and we may say that Christianity had no more</p>
III	INDIAN NOTES

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<p>effect on the customs and beliefs of the Hawikuh people than the material things which the white man introduced among them.</p> <p style="text-align: center;">NOTES</p> <ol style="list-style-type: none"> 1. WINSHIP, G. P., The Coronado Expedition, 1540-42, <i>Fourteenth Ann. Rep. Bur. Amer. Ethn.</i>, pt. 2, pp. 518, 559-562, 569, 573, 586, Washington, 1896. 2. STEVENSON, M. C., The Zuñi Indians, <i>Twenty-third Ann. Rep. Bur. Amer. Ethn.</i>, p. 532, Washington, 1905. 3. Information kindly furnished by Dr Elsie Clews Parsons. 4. WINSHIP, op. cit., p. 563. 5. STEVENSON, op. cit., p. 280, fig. 10. See also PARSONS, The Zuñi Molawia, <i>Jour. Amer. Folk-lore</i>, vol. XXIX, p. 395, July-Sept., 1916. Dr Parsons says that "Bitsitsi is an onomatopoetic term for his rabbit-like whistle." 6. LUMHOLTZ, Carl, Unknown Mexico, vol. II, p. 155, fig., New York, 1902. 	
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